STEREO AUTO REVERSE DOUBLE CASSETTE DECK

X-7WX

SERVICE MANUAL

KENWOOD

KENWOOD CORPORATION

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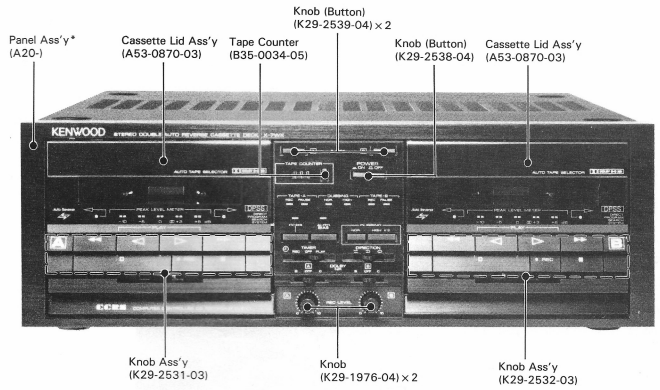

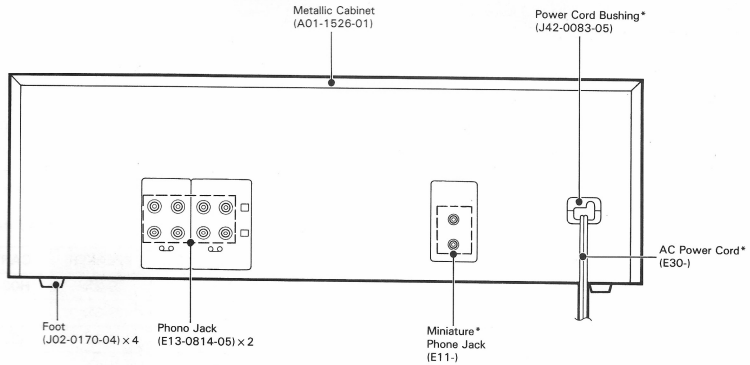

* Refer to Parts List on page 52

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SPECIFICATIONS ..... BACK COVER

In order of top photo

P-7X
RC-9X (option)
T-7LX
A-7X
X-7WX
S-7VX (SPEAKERS)

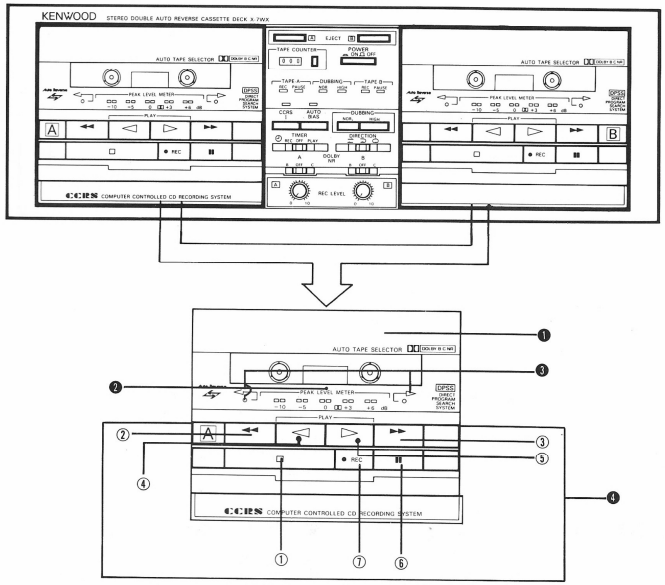
Photo is MIDI M-50

SYSTEM CONFIGURATION AND CARTON BOX (FOR SYSTEM PACKING).

The system configuration and system packing carton box except speakers are as follows.

SYSTEM	AMP	TUNER	CASSETTEDECK	TURNTABLE	SPEAKER	CARTON BOX
M-30	A-3X	T-3LX/3X	X-3WX	P-3X	S-3X	H03-0878-04
M-40	A-3X	T-7LX/7X	X-3WX	P-5X	S-3X	—
M-50	A-5X	T-7LX/7X	X-5WX	P-5X	S-5X	H03-0879-04
M-50X	A-5X	T-7LX/7X	X-3WX	P-5X	S-5X	—
M-70	A-7X	T-7LX/7X	X-7WX	P-7X	S-7VX	H03-0880-04

FUNCTION AND OPERATION



❶ Cassette holder

❷ PEAK LEVEL meter

Indicates the recording level during recording and the peak value of the playback level during play back.

❸ Direction indicator

Indicates running direction of tape.
▷ indicator is for forward.
◁ indicator is for reverse.

❹ Operation keys

① STOP (□)
Press this key to stop the tape.

② REWIND (◀◀)
Press this key to advance the tape rapidly to the left.

③ FAST FORWARD (▶▶)
Press this key to advance the tape rapidly to the right.

④ REVERSE PLAY (◁)
Press this key to playback the back side of the cassette.

⑤ PLAY (▷)
Press this key to play the front side of the cassette.

⑥ PAUSE (❚❚)
Press this key to stop the tape for a moment during playback or recording.

⑦ REC (●)
Press this key to record.

❺ A-EJECT, B-EJECT key

Open the cassette holder of the corresponding deck.
Do not press the key during operation.

❻ TAPE COUNTER/reset button

The number changes according to the tape run.
Pressing RESET displays "000" (A deck only)

❼ DOLBY NR switch

To play back the tape recorded with DOLBY NR (Noise Reduction) or to record with DOLBY NR, set this switch to B or C.

Note:

DOLBY and doule-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
Noise reduction circuit made under license from Dolby Laboratories Licensing Corporation.

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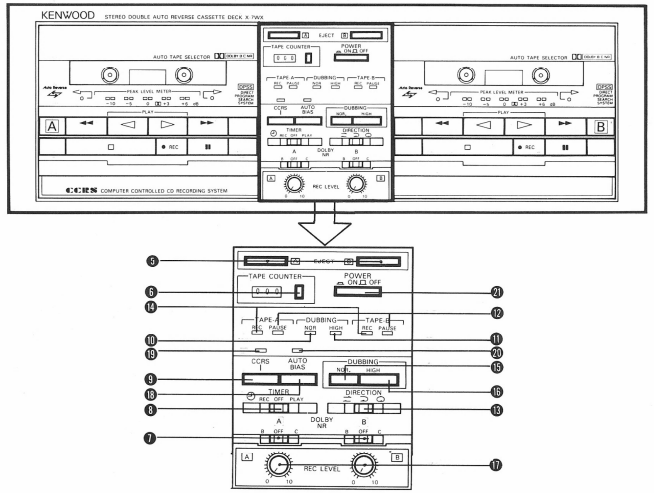
FUNCTION AND OPERATION



❽ TIMER STANDBY switch (TIMER)

To set the unit to record or playback at a predetermined time

OFF : Set to OFF when the timer is used for the tuner or when the timer is not used for the cassette deck (when the timer does not start the cassette deck).
PLAY : Set to PLAY for playback.
REC : Set to REC for recording.

❾ CCRS (Computer CD Recording System) key and indicator (B deck only)

Used to record the compact disc sound with optimum recording level.

❿ NORMAL DUBBING indicator

⓫ HIGH SPEED DUBBING indicator (HIGH)

⓬ PAUSE indicator

⓭ DIRECTION switch

NORMAL mode (⇄): Set to this position, to record or play back on one side of the tape. The tape stops when one side ends.
REVERSE mode (⇉): Set to this position, to record or play back on both sides.
ENDLESS mode (⟲): Set to this position, to play both sides repeatedly.

⓮ REC indicator

⓯ NORMAL DUBBING key (NOR.)

Pressing this key illuminates the NORMAL DUBBING indicator and dubbing can be done from A to B deck.

⓰ HIGH SPEED DUBBING key (HIGH)

Pressing this key illuminates the HIGH SPEED DUBBING indicator and high speed dubbing can be done from A to B deck.

⓱ REC LEVEL knob

Controls recording level.

⓲ AUTO BIAS adjustment key (B deck only)

Used to adjust the amount of bias appropriately for tape used. When the optimum amount of bias is set, the indicator lights.

⓳ CCRS indicator

⓴ AUTO BIAS indicator

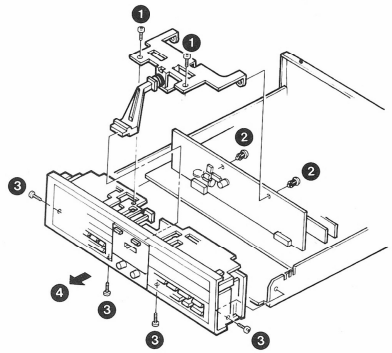
㉑ POWER switch

Press this switch to turn on the power. To turn off, press the switch again.

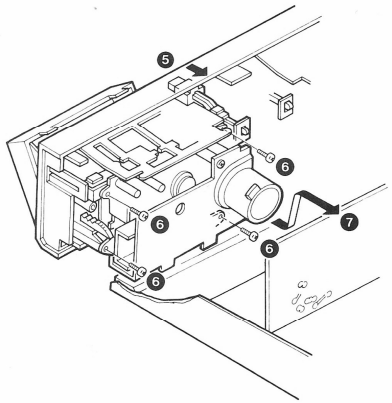
DISASSEMBLY FOR REPAIR

REMOVAL OF MECHANISM ASS'Y

1. Remove the screw at the side of the case.
2. Remove the two screws at the rear of the case, and remove the case.
3. Remove the two screws (❶) and two push rivets (❷) of the mechanism bracket.
4. Remove the four screws (❸), two at the underside of the panel and two at the right and left sides of the panel.
5. Draw out the panel towards front (❹).



6. Press the EJECT button to open the cassette holder forwards (❺).
7. Remove the four screws mounting the mechanism (❻).
8. Detach the mechanism from the panel (❼).



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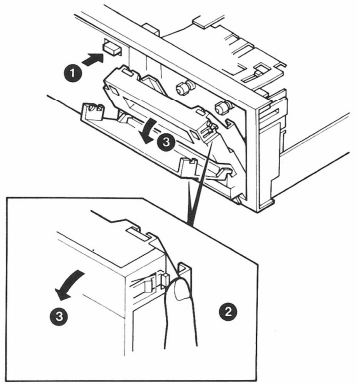
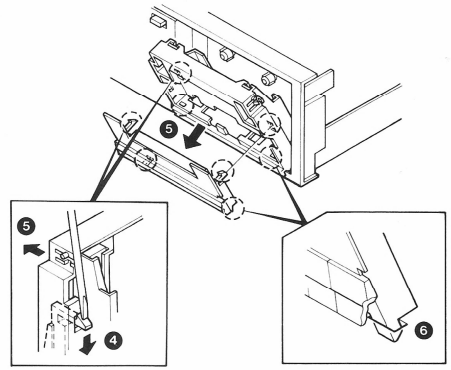
DISASSEMBLY FOR REPAIR

REMOVAL OF CASSETTE HOLDER, CASSETTE LID AND OPERATION P.C board

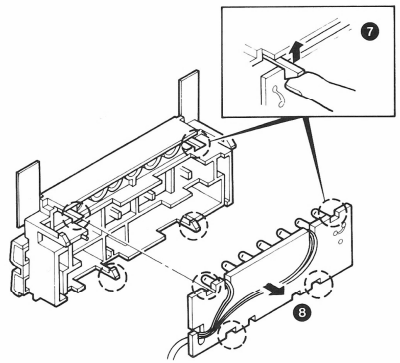
1. Press the EJECT button to open the cassette holder forwards (❶).
2. Push the catches at the both sides of the cassette holder (❷).
3. Remove the cassette lid while pressing location (❷), (❸).



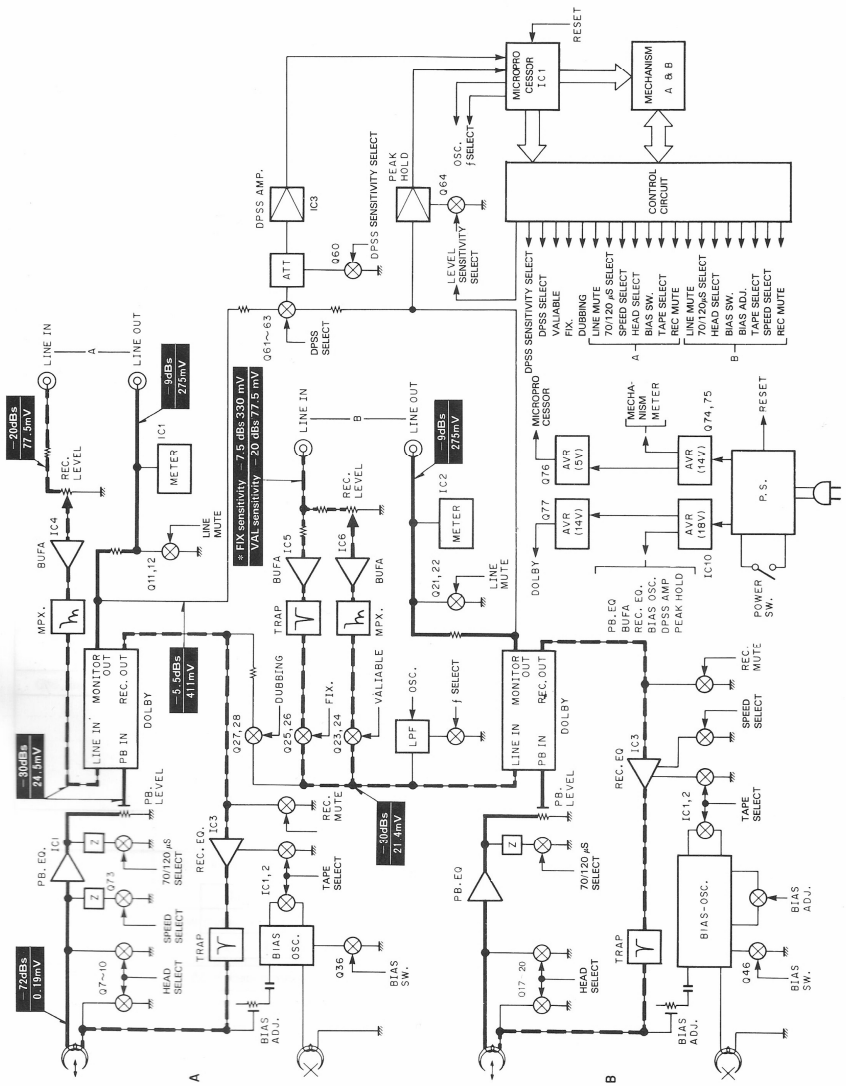
4. For removal of the operation P.C board, push the catch at the rear of the cassette holder (❹).
5. Draw out the operation P.C board forwards together with the KNOB ass'y (❺).
6. In assembly, pay attention to the catch at the underside (❻).



7. Disengage the four catches of the operation P.C board (❼).
8. The operation P.C board can detach from the KNOB ass'y (❽). Peak level and direction indicator LEDs are attached to the operation P.C board.



BLOCK LEVEL DIAGRAM



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CIRCUIT DESCRIPTION

RECORD/PLAY BACK UNIT (X28-1790-00)

Components	Application/functions	Operation/conditions/compatibility
Q1, 2	Frequency response compensation in high-speed dubbing	Controlled by pin 7 of IC9. Normal: ON. High speed dubbing: OFF.
Q3, 4, 5, 6	Record/play selection and play output muting (Deck A)	Controlled by Q32. Normal: OFF. REC/REC PAUSE: OFF. No interchangeable transistors with Q3 and Q4.
Q7, 8, 9, 10	Record/play head selection (Deck A)	Controlled by Q31. Normal: ON. REC/REC PAUSE: OFF. No interchangeable transistors.
Q11, 12	Line mute (Deck A)	Controlled by Q58. Normal: ON. PLAY/REC/REC PAUSE: OFF. No interchangeable transistors.
Q13, 14, 15, 16	Record/play selection and play output muting (Deck B)	Controlled by Q42. Normal: OFF. REC/REC PAUSE: ON. No interchangeable transistors with Q13 and Q14.
Q17, 18, 19, 20	Record/play head selection (Deck B)	Controlled by Q41. Normal: ON. REC/REC PAUSE: OFF. No interchangeable transistors.
Q21, 22	Line mute (Deck B)	Controlled by Q59. Normal: ON. PLAY/REC/REC PAUSE: OFF. No interchangeable transistors.
Q23, 24	Recording input selection [VAL.] (Deck B)	Controlled by Q66. Normal: ON. Dubbing/CCRS/AUTO BIAS: OFF.
Q25, 26	Recording input selection [FIX] (Deck B)	Controlled by Q65. Normal: OFF. ON in CCRS recording, or play while auto-bias is set. However, OFF halfway when play output is extremely low.
Q27, 28	Recording input selection [DUB] (Deck B)	Controlled by Q67. Normal: OFF. Dubbing: ON.
Q29, 30	Play output mute for dubbing	Controlled by Q70. Normal: ON. Dubbing: OFF.
Q31, 32, 33	Record/play selection control (Deck A)	Controlled by R/P (A) signal of microprocessor. | | Normal | REC/REC PAUSE | | Q31, 32 | ON | OFF | | Q33 | OFF | ON |
Q34	Auto tape selector (Deck A)	Controlled by sensor in mechanism of deck A. Normal: ON. OFF with normal tape or CrO_2 tape loaded.
Q35	Bias OSC (Deck A)	No interchangeable transistor. In its replacement, readjust bias OSC/bias level.
Q36	Bias ON/OFF switch (Deck A)	Controlled by microprocessor. REC: ON. Other: OFF.
Q37, 38	Bias current adjustment (Deck A)	Controlled by sensor in mechanism of deck A and Q34. | | Normal | CrO_2 | Metal or no tape loaded | | Q37 | OFF | OFF | ON | | Q38 | OFF | ON | OFF |
Q39, 40	Bias current adjustment (Deck B)	Controlled by Q55. Normal tape: ON. Other: OFF.
Q41, 42, 43	Record/play selection control (Deck B)	Controlled by R/P (B) signal of microprocessor. | | Normal | REC/REC PAUSE | | Q41, 42 | ON | OFF | | Q43 | OFF | ON |
Q44	Auto tape selector (Deck B)	Controlled by sensor in mechanism of deck B. METAL: ON. Other: OFF
Q45	Bias OSC (Deck B)	No interchangeable transistor. In its replacement, readjust bias OSC/bias level.
Q46	Bias ON/OFF switch (Deck B)	Controlled by microprocessor. REC: ON. Other: OFF

CIRCUIT DESCRIPTION

<table>
<tr><th>Components</th><th>Application/functions</th><th>Operation/conditions/compatibility</th></tr>
<tr><td>Q47 ~ 51</td><td>Bias current adjustment (Deck B)</td><td>Controlled by sensor in mechanism of deck B and microprocessor.
<table>
<tr><th></th><th>Normal</th><th>CrO_2</th><th>Metal or no tape loaded</th><th>In auto-bias operation</th></tr>
<tr><td>Q47</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>Q48</td><td>OFF</td><td>ON</td><td>ON</td><td>May turn ON with normal tape loaded.</td></tr>
<tr><td>Q49</td><td>OFF</td><td>OFF</td><td>OFF</td><td>May turn ON.</td></tr>
<tr><td>Q50</td><td>ON</td><td>ON</td><td>ON</td><td>May turn OFF</td></tr>
<tr><td>Q51</td><td>OFF</td><td>OFF</td><td>OFF</td><td>May turn ON.</td></tr>
</table>
For auto-bias operation, refer to "Circuit description".</td></tr>
<tr><td>Q52</td><td>Muting for oscillation output</td><td>Controlled by microprocessor. Normal: ON. AUTO BIAS: OFF</td></tr>
<tr><td>Q55</td><td>Drive for bias current adjustment (Deck B)</td><td>Controlled by sensor in mechanism of deck B.
Normal tape: ON. Other: OFF</td></tr>
<tr><td>Q56</td><td>Recording mute drive (Deck A)</td><td>Controlled by microprocessor. Normal: ON. REC: OFF.</td></tr>
<tr><td>Q57</td><td>Recording mute drive (Deck B)</td><td>Controlled by microprocessor. Normal: ON. REC: OFF.</td></tr>
<tr><td>Q58</td><td>Line mute drive (Deck A)</td><td>Controlled by microprocessor. Normal: ON. PLAY/REC/REC PAUSE: OFF.</td></tr>
<tr><td>Q59</td><td>Line mute drive (Deck B)</td><td>Controlled by microprocessor. Normal: ON. PLAY/REC/REC PAUSE: OFF</td></tr>
<tr><td>Q60</td><td>DPSS sensitivity selection</td><td>Controlled by microprocessor. CUE: ON. Other: OFF</td></tr>
<tr><td>Q61, 62, 63</td><td>DPSS deck A/B selection</td><td>Controlled by microprocessor.
<table>
<tr><th></th><th>When deck A is in PLAY or in DPSS mode</th><th>When deck B is in PLAY or in DPSS mode</th><th>In other cases</th></tr>
<tr><td>Q61</td><td>ON</td><td>OFF</td><td>Unfixed</td></tr>
<tr><td>Q62</td><td>OFF</td><td>ON</td><td>Unfixed</td></tr>
<tr><td>Q63</td><td>ON</td><td>OFF</td><td>Unfixed</td></tr>
</table></td></tr>
<tr><td>Q64</td><td>Level amplifier sensitivity selection</td><td>Controlled by microprocessor. Normal: ON. OFF in play in auto-bias operation.</td></tr>
<tr><td>Q65, 66, 67</td><td>Drive for recording input selection (Deck B)</td><td>Controlled by IC9.
<table>
<tr><th></th><th>Normal</th><th>In CCRS recording</th><th>Dubbing</th><th colspan="2">AUTO BIAS</th></tr>
<tr><td></td><td></td><td></td><td></td><td>REC</td><td>PLAY</td></tr>
<tr><td>Q65</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON (Can also be OFF)</td></tr>
<tr><td>Q66</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>Q67</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
</table></td></tr>
<tr><td>Q68</td><td>DPSS switch</td><td>Controlled by IC3 (DPSS amplifier). Normal: OFF. ON when output of more than about 30dBs appears from LINE OUT terminal either in deck A or in deck B.</td></tr>
<tr><td>Q69</td><td>Level output slice</td><td>When output of IC3 (level amplifier) exceeds about 5V, turns ON to slice it to 5V.</td></tr>
<tr><td>Q70, 71, 72</td><td>Dubbing switch</td><td>Controlled by microprocessor. Normal: OFF. Dubbing: ON.
Q70 ... Dubbing output mute drive
Q71 ... Dolby OFF control in dubbing (Deck A)
Q72 ... Dolby OFF control in dubbing (Deck B)</td></tr>
</table>

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CIRCUIT DESCRIPTION

<table>
<tr><th>Components</th><th>Application/functions</th><th>Operation/conditions/compatibility</th></tr>
<tr><td>Q73</td><td>Speed selection</td><td>Controlled by IC9. Normal: ON. High-speed dubbing: OFF</td></tr>
<tr><td>Q74, 75</td><td>AVR for deck A/B mechanism</td><td>+14V</td></tr>
<tr><td>Q76</td><td>AVR for microprocessor</td><td>+6V</td></tr>
<tr><td>Q77</td><td>AVR for Dolby</td><td>+14V</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>IC1, 2</td><td>IC for level meter</td><td></td></tr>
<tr><td>IC3</td><td>DPSS and level amplifier</td><td></td></tr>
<tr><td>IC4, 5, 6</td><td>Recording input buffer</td><td>IC4 ... Deck A. IC5 ... Deck B [FIX]. IC6 ... Deck B [VAL.]</td></tr>
<tr><td>IC7, 8</td><td>Recording equalizer device selection</td><td rowspan="2">
<table>
<tr><th>[ON condition]</th><th>IC7</th><th>IC8</th><th>IC9</th></tr>
<tr><td>Between pins 1 and 9</td><td>With METAL tape or no tape (L)</td><td>Normal</td><td>Normal</td></tr>
<tr><td>Between pins 2 and 8</td><td>With CrO_2 tape (L)</td><td>High-speed dubbing</td><td>CCRS recording</td></tr>
<tr><td>Between pins 3 and 7</td><td>With METAL tape or no tape (R)</td><td>Normal</td><td>High-speed dubbing</td></tr>
<tr><td>Between pins 4 and 6</td><td>With CrO_2 tape (R)</td><td>High-speed dubbing</td><td>Dubbing</td></tr>
</table>
</td></tr>
<tr><td>IC9</td><td>Drive for recording input selection (Deck B)</td></tr>
<tr><td>IC10</td><td>Signal system AVR</td><td>+18V</td></tr>
</table>

CIRCUIT DESCRIPTION

CONTROL CIRCUIT UNIT (X29-1800-00)

Components	Application/functions	Operation/conditions/compatibility
IC1	Microprocessor	
Q1	LED switch	Turns ON/OFF LEDs D30, D32, D34 and D36.
Q2	LED switch	Turns ON/OFF LEDs D29, D31, D33 and D35.
Q3	LED drive	LED D35 (B REC), LED D36 (B PAUSE)
Q4	LED drive	LED D29 (CCRS), LED D30 (BIAS)
Q5	LED drive	LED D33 (DUB), LED D34 (HIGH-SPEED DUB)
Q6	LED drive	LED D31 (A REC), LED D32 (A PAUSE)
Q7	Amplifier	Deck A mechanism quick-reverse detection
Q8	Amplifier	Deck B mechanism quick-reverse detection
Q9	Switch reset	ON at power ON, OFF at power OFF
Q10	Switch reset	OFF at power ON, OFF at power ON
Q11	Deck A motor speed switch	OFF in normal speed
Q12	Deck B motor speed switch	OFF in normal speed
Q13	Deck A motor speed switch	ON in normal speed
Q14	Deck B motor speed switch	ON in normal speed
Q15	Solenoid drive	Drives SOL 2 of deck A mechanism
Q16	Solenoid drive	Drives SOL 2 of deck B mechanism
Q17	Solenoid drive	Drives SOL 1 of deck A mechanism
Q18	Solenoid drive	Drives SOL 1 of deck B mechanism
Q19	Kick switch	ON when deck A/B mechanism is kicked
Q20	Kick drive	ON when deck A/B mechanism is kicked
Q21	Filter switch	ON in 400Hz oscillation during bias setting
Q22	Filter switch	ON in 400Hz oscillation during bias setting

RECORDING EQUALIZER DOTER (X87-1140-00)

Components	Application/functions	Operation/conditions/compatibility
Q1, 2	Signal muting	When pin 5 of CN2 becomes "H". Q1 and Q2 turn ON so that muting is applied to the input signals from pin 1 of CN1 and pin 9 of CN2.
IC1, 2	Equalizer selection	Those pins 1-7 of IC1 (IC2) to which pins 6 and 7 of CN1 and pins 1-4 of CN2 are connected are controlled to turn ON/OFF each equalizer device. When each input pin becomes "H", the output side (pins 10-16 of each IC) conducts with GND (pin 8) to determine the NF constant of IC3.
IC3	Recording equalizer amplifier	It operates on single power supply and is used with the input voltage pulled up to 1/2 V_B. Its NF constant is determined by IC1 : IC2, thus providing the recording equalizer characteristics.

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CIRCUIT DESCRIPTION

AUTO-BIAS CIRCUIT

The auto-bias circuit is broadly subdivided into three: oscillation, level detection and bias varying circuits. Basically, the reference signal of −20dBs, 400Hz and the 10kHz signal of which the bias quantity is varied in the five steps are recorded. Then, of this playback output, the difference in level between the reference signal and the 10kHz signal is detected by the level detection circuit, and the bias is fixed to the bias quantity which provides the smallest difference. This operation sequence is controlled by the microprocessor.

The oscillation circuit and the level detection circuit work only on the right channel which is less subject to the effect of the azimuth deviation.

From the oscillation circuit, a square wave output from a microprocessor port is applied to DOLBY REC IN by way of the low-pass filter consisting of the two CR stages. At this time, during oscillation, the transistor switches Q24, Q26 and Q28 are all turned OFF to cut off the normal signal. In addition, when no oscillation is made, to avoid the adverse effect of the microprocessor noise, short-circuiting is made by Q52, Q21 and Q22 act as the switch to select between 400Hz and 10kHz for the low-pass filter.

The level detection circuit and the bias varying circuit are described later.

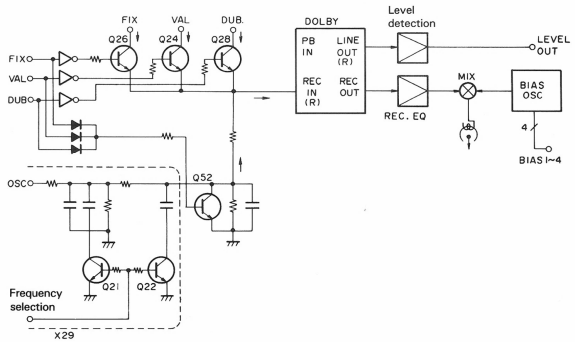
Next let us detail the operation of the microprocessor. At first, when the AUTO BIAS key is pressed, every switch to select the REC IN input is turned OFF and 400Hz oscillation begins. Then deck B enters the recording. However, in this case for about 10sec, the mute mode is engaged because of the presence of leader tape section or for the operation of music scan.

After that for about 1sec, the switch to select between 400Hz and 10kHz for the low pass filter is turned OFF, and a sqaure wave of 400Hz is recorded (for easier music scan). Then the low pass filter is turned ON to convert this signal to a sine wave, which is in turn recorded 4sec.

Subsequently, the bias quantity is varied from low to high (from "all OFF" to "bias 1", to "bias 2", to "bias 3", then to "bias 4"), and 10kHz is recorded on the respective bias levels, 2sec each (the switch to select between 400Hz and 10kHz for the low pass filter is OFF).

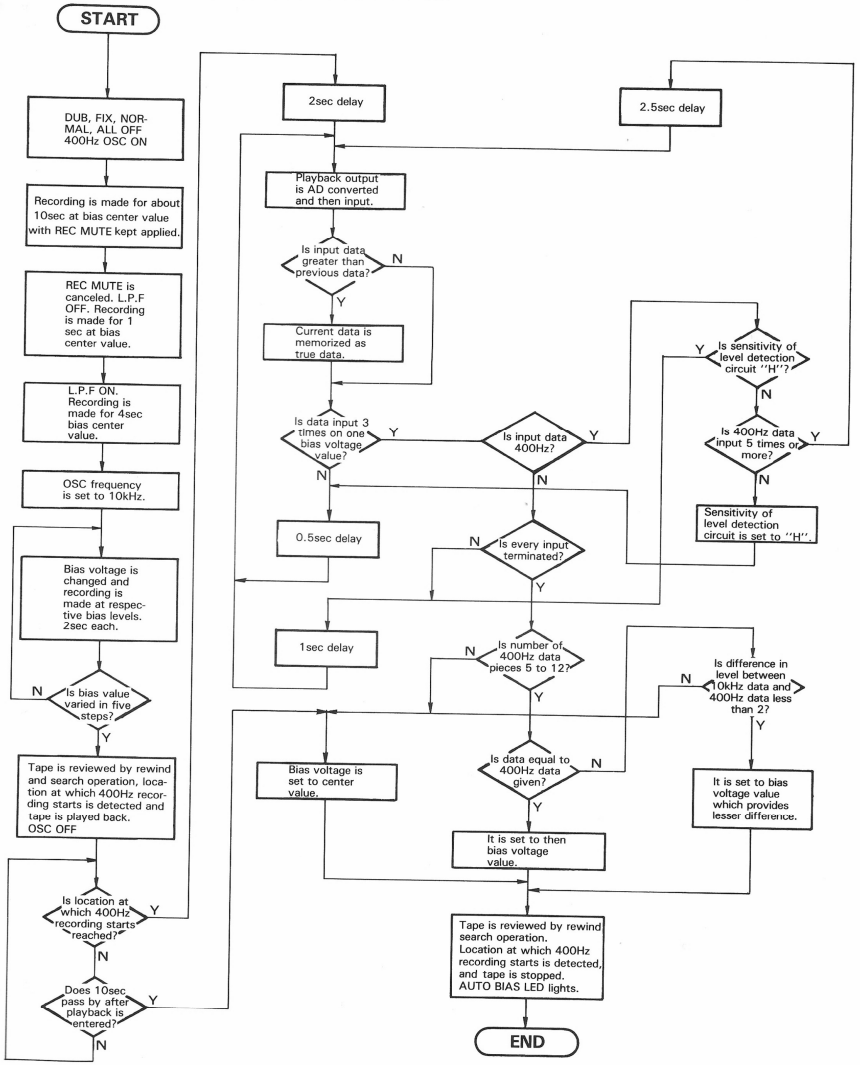
After termination of recording, the tape is rewind by use of the DPSS function and enters the playback. At first, the reference for level is memorized on the sine wave of 400Hz. In this case, when the level is abnormally low, the sensitivity of the level detection amplifier is raised for rememorizing. Then the level of the 10kHz signal is read, and it is fixed to the bias value which is the nearest to the reference value, and the tape is rewind again. Therewith, this process terminates.

Before termination, when the STOP button is pressed, the auto-bias operation stops. However, after termination, the set bias level is kept unless otherwise the EJECT button is pressed. In addition , when the level of the 10kHz signal is not within about ±3dB, the bias quantity is fixed to the center value after operation.



CIRCUIT DESCRIPTION

FLOWCHART OF AUTO-BIAS ADJUST OPERATION


START
DUB, FIX, NORMAL, ALL OFF 400Hz OSC ON
Recording is made for about 10sec at bias center value with REC MUTE kept applied.
REC MUTE is canceled. L.P.F OFF. Recording is made for 1 sec at bias center value.
L.P.F ON. Recording is made for 4sec bias center value.
OSC frequency is set to 10kHz.
Bias voltage is changed and recording is made at respective bias levels. 2sec each.
Is bias value varied in five steps?
Tape is reviewed by rewind and search operation, location at which 400Hz recording starts is detected and tape is played back. OSC OFF
Is location at which 400Hz recording starts reached?
Does 10sec pass by after playback is entered?
2sec delay
Playback output is AD converted and then input.
Is input data greater than previous data?
Current data is memorized as true data.
Is data input 3 times on one bias voltage value?
0.5sec delay
1sec delay
Bias voltage is set to center value.
2.5sec delay
Is input data 400Hz?
Is every input terminated?
Is number of 400Hz data pieces 5 to 12?
Is data equal to 400Hz data given?
It is set to then bias voltage value.
Is sensitivity of level detection circuit "H"?
Is 400Hz data input 5 times or more?
Sensitivity of level detection circuit is set to "H".
Is difference in level between 10kHz data and 400Hz data less than 2?
It is set to bias voltage value which provides lesser difference.
Tape is reviewed by rewind search operation. Location at which 400Hz recording starts is detected, and tape is stopped. AUTO BIAS LED lights.
END

X-7WX

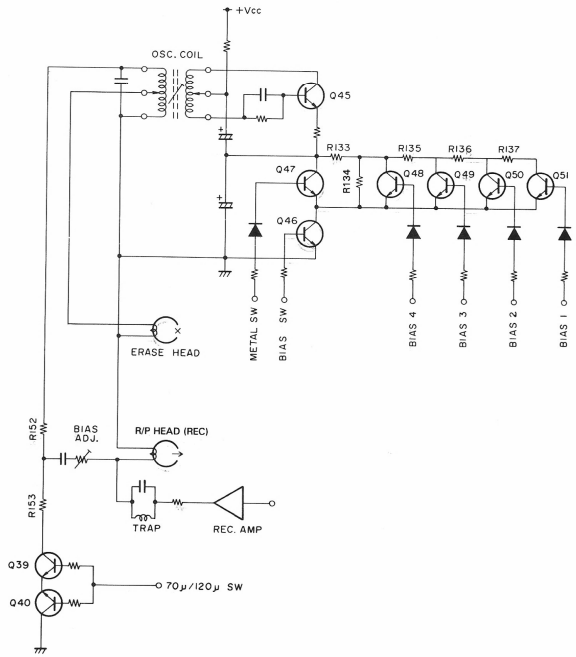
CIRCUIT DESCRIPTION

BIAS VARYING CIRCUIT

Conventionally, when the bias current need be adjusted due to the discrepancy between tapes. The emitter current of the oscillation transistor Q45 is adjusted by changing its associated resistance value. This method is applied to change the bias quantity in the five steps assumed between the conventional NORMAL tape and CrO_2 tape positions. Namely, no auto-bias is applied to the CrO_2 or METAL tape.

When Q47 is turned ON, the bias quantity in the conventional METAL tape position is engaged, while when Q48 is turned ON, the bias quantity in the conventional CrO_2 tape position is engaged. Thus, the bias quantity varies in the five steps: "bias 4", "bias 3", "bias 2", "bias 1" and "all Tr OFF". The center value of the bias quantity in the NORMAL tape position is given when "bias 2" is ON. Assuming that this point of "bias 2" refers to the conventional bias current value, when "bias 1" or every transistor is OFF, the erase current is smaller than conventional. Thus providing an erasing coefficient different from conventional.

To counter this, the bias quantity given when every transistor is OFF is set to the conventional value to assure the minimum necessary value of the erase current, and the bias voltage is divided by R152 and R153 so that for only the recording bias current, the standard value in the conventional NORMAL tape position is given when "bias 2" is ON. This voltage division must be only for the NORMAL tape position. Therefore, only with a NORMAL tape Q39 and Q40 are turned ON by the 70μsec/120μsec select switch.



CIRCUIT DESCRIPTION

LEVEL DETECTION CIRCUIT

To discrimintate the record/play frequency response by use of an analog port of the microprocessor, it is necessary to detect the playback output. Basically, a signal of −30dBs to −14dBs is substituted by 0 to 5V in the peak hold circuit for easier discrimination in the microprocessor.

At first, the signal from DOLBY line out is half-wave amplified and that output is rectified and level-shifted simultaneously in D6 and C80. Further, it is rectified in D7 and C82 into DC. Here, as regards the temperature characteristics. D4 and D5 are negative and D7 and D8 are positive. Therefore mutual temperature compensation is made.

The I/O characteristics of this circuit system are as shown in Fig. 3. Its discrimination ability is ±4dB to 5dB with the center of −20dBs. However, when the level is extremely below −20dBs because of irregularity between tapes, as the slope of the graph in Fig. 3 is gentle. The discrimination ability lowers. To counter this, in this case, the discrimintation ability is raised by changing the amplifier sensitivity by the microprocessor. More, in the NORMAL tape playback signals of more than +6dB are also given and thus the output at point ⓓ rises up to the level of $V_D/2$. To protect the microprocessor, more than 5V is sliced out.

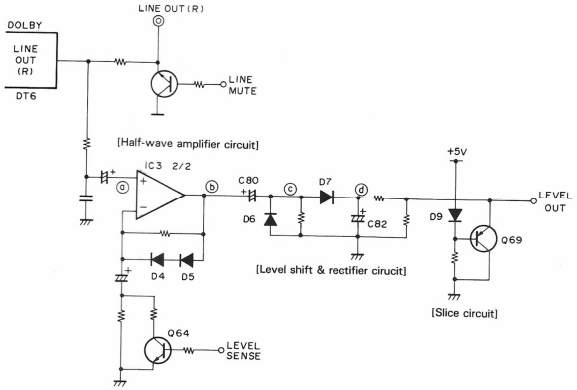


Fig. 1

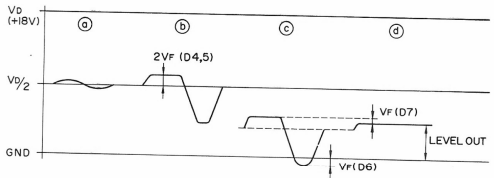


Fig. 2

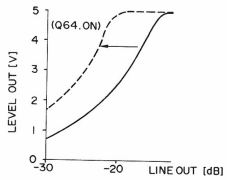


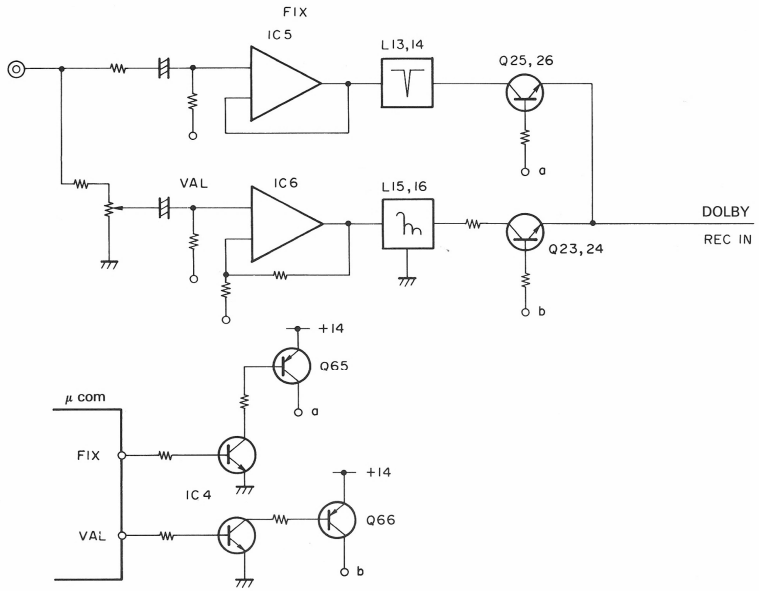
Fig. 3

X-7WX

CIRCUIT DESCRIPTION

CCRS

Normally, the microprocessor makes the VAL signal "H" to turn ON Q23 and Q24. However, in the CD recording in the CCRS mode, the microprocessor selects the FIX signal to turn ON Q25 and Q26. Thereby, the signal whose level is fixed through REC VOL is input to DOLBY.



CIRCUIT DESCRIPTION

OPERATION SPECIFICATION

1 FUNCTION OUTLINE

1-1 Normal operation mode

(1) Either deck A or B performs the respective operations of FWD PLAY, RVS PLAY, FF, REW, REC, REC PAUSE, PLAY PAUSE and STOP by means of the seven keys. In PLAY or REC, it is possible to select one-way reverse or repeat mode (only in PLAY) by means of the reverse mode switch.

(2) Relay play
With the reverse mode switch set to ⇄ or ⊃ and cassettes loaded in both decks, when the deck in PLAY reaches the tape end, the other deck enters PLAY automatically.

(3) Relay recording
With the reverse mode switch set to ⇄ or ⊃ and cassettes loaded in both decks, when one deck is in REC and the other deck is in REC PAUSE with the same recording source, when the deck in REC reaches the tape end, the ohter deck enters REC.

1-2 Dubbing

It is possible to perform normal-speed or high-speed dubbing from deck A to deck B by means of the DUBBING or H DUBBING key.

1-3 DPSS mode

Each of the skip music scan, one-tune repeat dush & play, fullrepeat, rewind play, re-rec standby and auto-rec mute operations is performed by double pressing of a key or holding of a key during operation.

1-4 Timer operation

It is possible to perform timer recroding or play by setting of the timer switch.

1-5 Auto-bias

The record/play levels of 400Hz and 10kHz are detected. The optimum bias of that tape is set. (Only for NORMAL tape)

1-6 Serial transmission function

It is possible to perform synchronous recording with a CD or analog player by use of full remote control and two-way easy operation in combination with a system having a serial transmission bus.

1-7 CCRS (Computer CD Recording System)

It is possible to automatically perform recording a CD in the optimum level and bias in combination with DP-770D

2 KEY FUNCTIONS

2-1 Key matrix layout

In this key matrix, five output ports are used for scan signal, and eight input ports are used for return signal. In addition, the logic is active low.
[A figure in ( ) denotes a pin No.]

Input / Output	P10 (4)	P11 (3)	P12 (2)	P13 (1)	P130 (26)	P131 (25)	P132 (24)	P133 (28)
P120 (22)	Deck A, Cassette half detection SW	Deck A, PLAY SW	Deck A, RVS REC enable SW	Deck A, FWD REC enable SW	Deck A, FWD PLAY key	Deck A, RVS PLAY key	Deck A, FF key	Deck A, REW key
P121 (21)	Deck B, Cassette half detection SW	Deck B, PLAY SW	Deck B, RVS REC enable SW	Deck B, FWD REC enable SW	Deck A, STOP key	Deck A, PAUSE key	Deck A, REC key	Deck A (*1), INDEX SCAN key
P122 (20)	Timer play	Timer recording	Reverse mode ⇄	Reverse mode ⊃	Deck B, FWD PLAY key	Deck B, RVS PLAY key	Deck B, FF key	Deck B, REW key
P123 (19)	DUB key	HI-SPEED DUB key	CCRS key	AUTO BIAS key	Deck B, STOP key	Deck B, PAUSE key	Deck B, REC key	Deck B (*1), BLANK SEARCH key
P121 (13)	Deck B, head direction detection SW	Deck A, head direction detection SW	Test mode 2 setting	Test mode 1 setting				

- *1 ... Not provided as hardware, though set as software. No corresponding circuit is given.
- Those written as SW are each a mechanism control leaf switch attached to mechanism. Those written as key are each an operation switch.
- The test mode is described later.

X-7WX

CIRCUIT DESCRIPTION

2-2 Mechanism switches
[Common to decks A and B]

Name	Description
Cassette half detection SW	This turns ON with cassette installed to cassette mechanism.
PLAY SW	This turns ON with head in CUE or PLAY position.
Reverse recording enable SW	This turns ON when recording in reverse direction (rear side of tape) is enabled (with pawl).
Forward recording enable SW	This turns ON when recording in forward direction (surface of tape) is enabled (with pawl).
Head direction detection SW	This turns ON with head in reverse direction (record/play of rear side of tape).

(1) When the cassette half detection switch is OFF, the operation keys of that deck and the DUB and H DUB keys are all inhibited from handling. In addition, of deck B, the CCRS and AUTO BIAS key are also inhibited.

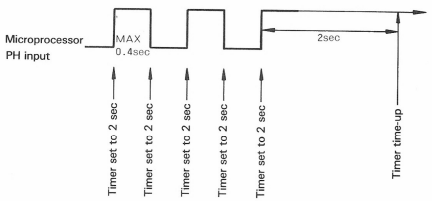
2-3 Key functions

Name	Function
FWD PLAY ► (common to decks A and B)	(1) When this key is pressed during FWD PLAY (forward play), one-tune repeat is entered. After 16 repetitions of the tune now in play, the normal play is entered. When previous one-tune repeat has been made, that number of repetitions is cleared, from which point 16 repetitions are newly performed. (2) When this key is pressed during other than FWD PLAY, the normal FWD PLAY is entered.
REV PLAY ◄ (common to decks A and B)	(1) When this key is pressed during RVS PLAY (reverse play), one-tune repeat is entered. After 16 repetitions of the tune now in play, the normal play is entered. When previous one-tune repeat has been made, that number of repetitions is cleared, from which point 16 repetitions are newly performed. (2) When this key is pressed during other than RVS PLAY, the normal RVS PLAY is entered.
FF ►► (common to decks A and B)	(1) During FWD PLAY : the skip music scan on the forward side of the tape in the forward direction is made (FWD FF search). After music scan, the normal play is entered. (2) During RVS PLAY : the skip music scan on the reverse side of the tape in the reverse direction is made (RVS REW search). After music scan, the normal play is entered. (3) During FWD FF search : the counter for skip music scan is given 1 increment (up to 16). (4) During RVS REW search : the counter for skip music scan is given 1 increment (up to 16). (5) During RVS REC : the RE-REC standby operation is made. (6) Others : the tape is wind on to the right reel in high speed. (FF)
REW ◄◄ (common to decks A and B)	(1) During FWD PLAY : the skip music scan on the forward side of the tape in the reverse direction is made (FWD REW search). After music scan, the normal FWD PLAY is entered. (2) During RVS PLAY : the skip music scan on the reverse side of the tape in the forward direction is made (RVS FF search). After music scan, the normal RVS PLAY is entered. (3) During FWD REW search by (1) : the counter for skip music scan is given 1 increment (up to 16). (4) During RVS FF search by (1) : the counter for skip music scan is given 1 increment (up ot 16). (5) During FWD REC : the RE-REC standby operation is made. (6) Others : the tape is rewind on to the left reel in high speed. (REW)
STOP ■ (common to decks A and B)	This stops every operation and stops the tape travel. In deck B, the dubbing, CCRS or auto-bias operation is stopped by this key.
REC ●/◆ (common to decks A and B)	(1) During stop, REP or ARM (Auto REC Mute) except during dubbing : the recording in the current head direction is made. (2) During REC not in dubbing : the ARM is entered. After a non-recorded section of about 4.5sec is made, the REC PAUSE is entered. (3) Others : invalid

CIRCUIT DESCRIPTION

Name	Function
PAUSE ⏸ (common to decks A and B)	(1) During PLAY : the PLAY PAUSE is entered. The PAUSE LED lights. (2) During REC or ARM : the REC PAUSE is entered. The PAUSE LED lights, and the REC, DUB or H DUB LED lights. (3) Others : invalid.
DUBBING	(1) During REP or ARM in STOP or dubbing of deck B with deck A not in REC : Deck A: Play in current head direction. Deck B: Dubbing REC. (2) During dubbing : Deck A: Kept as it is. Deck B: DUB REC PAUSE after ARM. (3) Others : invalid
HI SPEED DUBBING	(1) During ARM or REP in STOP high-speed dubbing of deck B with deck A not in REC : Deck A: High-speed play in current head direction. Deck B: High-speed dubbing REC. (2) During high-speed dubbing : Deck A: Kept as it is. Deck B: H DUB REC PAUSE after ARM. (3) Others : invalid
AUTO BIAS (deck B only)	(1) When auto bias is not set yet with decks A and B both in stop : the auto-bias operation is entered. (2) Others : invalid
CCRS (deck B only)	(1) During Auto Bias adjust or stop of deck B with deck A in stop : the CCRS setting operation is entered.

- During CCRS, any other key than the STOP key of deck B is not accepted.
- During auto bias, any other key than the STOP key of deck B and the CCRS key is not accepted.
- During dubbing or high-speed dubbing, when a key of deck A is operated, deck A enters its corresponding mode and deck B enters the REC PAUSE after ARM.
- The dush & play full-repeat is entered by double pressure of ◀◀ and ▶▶ keys. (Detailed later)
- The rewind play is entered by ◀◀ and ▶ keys or ▶▶ and ◀ keys. (Detailed later)



3 FUNCTION DETAILS

3-1 Auto stop

In a tape travel status other than STOP, REC PAUSE and PLAY PAUSE , when the signal from the photo-reflector attached to the mechanism reel stand keeps "H" or "L" for more than 2 sec the tape stops or the head is reversed.

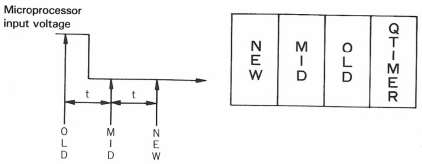
As shown above, each time that the output of the photo-reflector attached to the rear side of the reel stand is reversed, the software timer of which the set time is 2sec is started. When the reel stand is rotating, that is when the output of the photo-reflector is reversed within 2sec, the timer is successively updated so that the timer does not stop.
When the output of the photo-reflector keeps a fixed value for more than 2sec the timer operates. Then, this operation is detected and the auto stop process is performed.

X-7WX

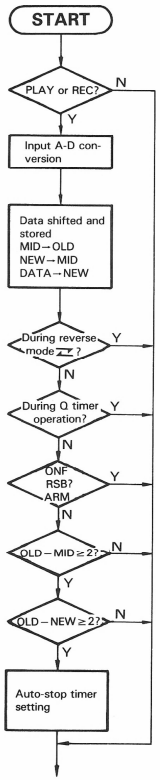
CIRCUIT DESCRIPTION

3-2 Quick reverse

The reverse operation or the stop operation is performed by detecting the boundary between the magnetic and leader sections of the cassette tape by the photo-reflector attached to the mechanism.
This microprocessor (μPD75106) is also usable as a 4-bit A-D converter. The variable threshold port provided to this microprocessor is used.
The sensor output is A-D converted, then stored in memory, and compared with the previous data to detect the boundary.



Operation flowchart



NEW: Current input data (4-bit)
MID: Input data given one time before
OLD: Input data given two times before
TIMER: Quick-reverse inhibit timer
t = 64 msec

ONE ..... During one-tune repeat
RSB..... Re-rec standby
ARM..... Auto rec mute

When the set time of the auto-stop timer passes away, the auto-stop routine is entered and the stop process is performed.

The relationship between reference voltage and hexadecimal value in A-D conversion ...

VREF [V]	A-D conversion value
0.16	] 0
0.47	] 1
0.78	] 2
1.09	] 3
1.41	] 4
1.72	] 5
2.03	] 6
2.34	] 7
2.66	] 8
2.97	] 9
3.28	] A
3.59	] B
3.91	] C
4.22	] D
4.53	] E
4.84	] F
VDD	

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CIRCUIT DESCRIPTION

Table of operation transition in auto stop:

Operation mode \ Reverse mode		⇄	⮌	⟲
Normal operation	FWD PLAY	STOP, REW in relay mode	RVS PLAY	RVS PLAY
	RVS PLAY	STOP, FF in relay mode	STOP	FWD PLAY
	FF	STOP	STOP	STOP
	REW	STOP	STOP	STOP
	FWD REC	STOP	FWD REC if RVS REC is OK. Otherwise STOP.	FWD REC if RVS REC is OK. Otherwise STOP.
	RVS REC	STOP	STOP	STOP
AUTO BIAS	Every mode	STOP	STOP	STOP
DPSS	ONE-TUNE REPEAT, AUTO REC MUTE, RE-REC STANDBY	STOP	STOP	STOP
	DUSH & PLAY	CUE→REW PLAY→REW REW→CUE	FWD CUE→RVS REV RVS REV→STOP FWD PLAY→RVS PLAY RVS PLAY→STOP	FWD CUE→RVS REV RVS REV→FWD CUE FWD PLAY→RVS PLAY RVS PLAY→FWD PLAY
	REW PLAY	REW→FF search	REW→FF search	REW→FF search
	Others	STOP	STOP if 2nd side of tape is engaged. If 1st side of tape is engaged, tape is reversed and that mode continues.	STOP if 2nd side of tape is engaged. If 1st side of tape is engaged, tape is reversed and that mode continues.

X-7WX

CIRCUIT DESCRIPTION

3-3 Relay play and relay recording

(1) With the reverse mode switch set to ⇄ or ⮌ and cassettes loaded in both decks, when the deck in play reaches the tape end, the other deck starts play.

i) ⇄ : When the deck in play reaches the end of that side of the tape, this deck rewinds the tape. In this connection, when the other deck is in stop, the playback in the head direction displayed at present is entered.

ii) ⮌ : When the deck in play reaches the end of the reverse (rear) side of the tape, this deck stops. In this connection, when the other deck is in stop, the forward play (FWD PLAY) is entered.

(2) Relay recording

Conditions: ① Decks A and B each have a recordable tape loaded.
② The reverse mode switch is set to ⇄ or ⮌.
③ One deck is in REC and the other deck is in REC PAUSE.
④ Decks A and B have the same recording source.
⑤ Not during AUTO REC MUTE.

When the above conditions are met, when the deck in REC reaches the tape end, the other deck enters the REC.

i) ⇄ : When the deck in REC reaches the end of that side of the tape, this deck stops and the other deck (in REP) enters the REC.

ii) ⮌ : When the deck in REC reaches the end of the reverse (rear) side of the tape, this deck stops and the other deck enters the REC. However, when the tape end is reached during FWD REC, when no pawl of the reverse direction is present, that deck stops and no relay operation is made.

3-4 Auto bias (Deck B only)

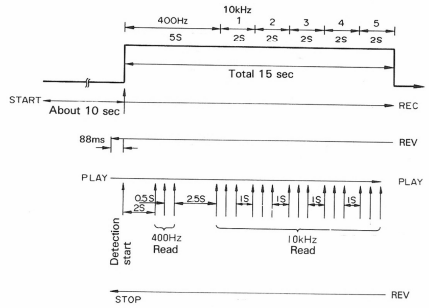
The reference signal of 400Hz and the 10kHz signal of which the bias quantity is varied in the five steps are recorded. Then, that playback level is read after A-D conversion, and the bias is set to the value which provides the smallest difference in level between 400Hz and 10kHz.

This operation is performed in the following procedure: (Refer to the operation flowchart.)

(1) Recording is made for about 10sec with REC MUTE kept ON (no-sound recording).
(2) 400Hz signal is recorded for 5sec at the reference bias quantity (the center bias value, at which line adjustment is made).
(3) 10kHz is recorded varying the bias quantity from low to high in the five steps, 2sec each.
(4) When the location at which 400Hz recording starts is detected by rewind search, the play is entered.
(5) 400Hz and 10kHz levels are read in 3 points for each bias value. The bias value which provides the smallest difference in level between these two signals is selected.
(6) When the location at which 400Hz recording starts is detected by rewind search, the tape stops.

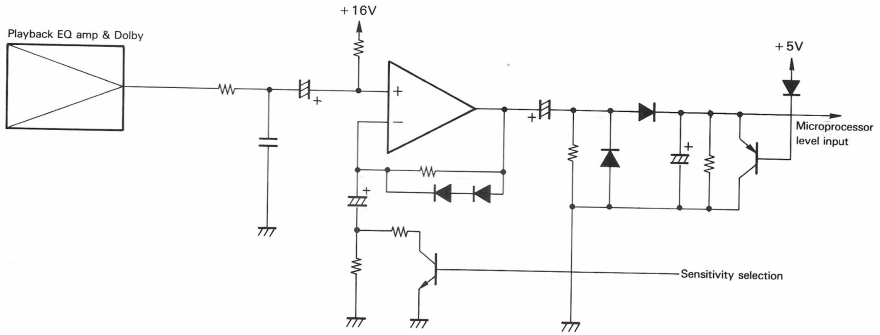
- During steps (1)—(6), the AUTO BIAS LED flickers. At termination of the operation, this LED lights. In addition, during steps (1)—(6), any other key than the STOP key of deck B and the CCRS key is inhibited. When the STOP key is pressed, the operation stops.
- The AUTO BIAS key is accepted only when decks A and B are in stop.
- Adjustment terminates in total of about 50sec, about 25sec for recording, 14.5sec + about 3sec for playback and 3sec × 2 for rewind search (review).

CIRCUIT DESCRIPTION



- Level read interval is 0.5sec.
- Level read point setting is made by the time control from the 400Hz recording start location.

- The playback signal is amplified and rectified to become about 2.5V ($V_{DD}/2$) DC at −20dBs, and is input to the variable threshold port of the microprocessor. The following outlines the circuit diagaram.

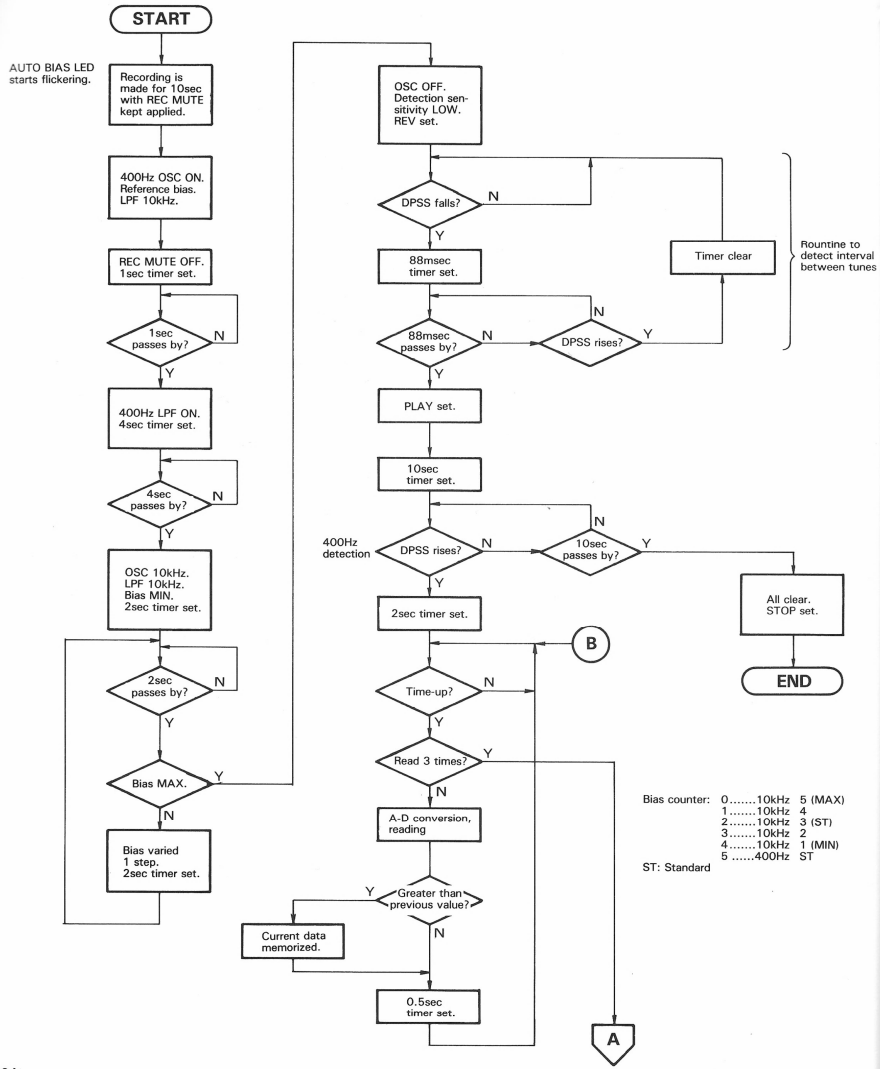


- The bias variation is controlled by four output ports.
- For the 400Hz or 10kHz signal, a square wave is output from the Tout pin of the microprocessor and then input to an amplifier as a sine wave by way of a low pass filter. The filter frequency response is changed between 10kHz and 400Hz.

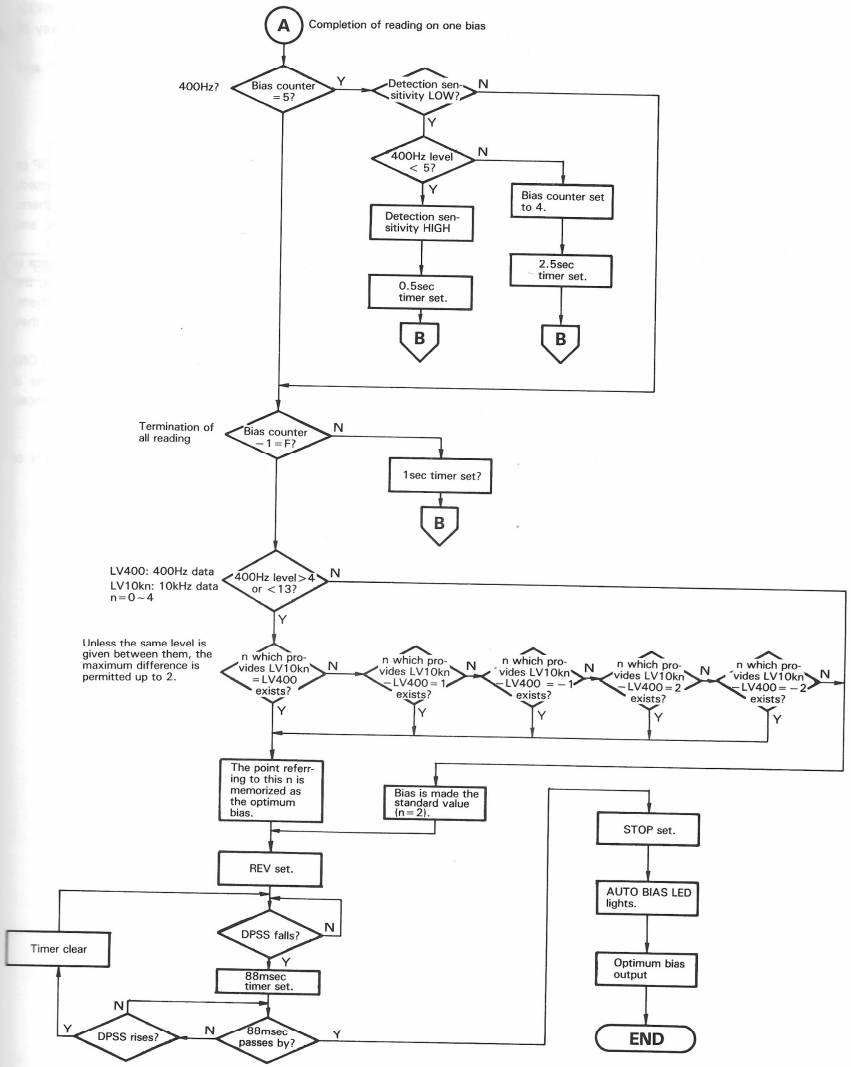
X-7WX

CIRCUIT DESCRIPTION

Auto-bias operation flowchart:



CIRCUIT DESCRIPTION



CIRCUIT DESCRIPTION

3-5 CCRS (Computer CD Recording System)

Synchronous recording of CD is made in the optimum level and bias by a single operation in combination with a CD player DP-770D (using uPD75206-015).

(1) Operation outline

i) Key acceptance condition

a. Decks A and B are both in STOP.

or

b. Deck A is in STOP and deck B is in auto-bias adjustment.

ii) Operation

When the condition of **i)** is met, when the CCRS key is pressed, CCRS starts. Thus, of the CD, the 1st to 3rd tune is searched for, the peak of the tune is detected, and the attenuator is set so that the maximum output voltage is constant irrespective of the CD.

The deck performs the auto-bias operation concurrently with the search for the tune on the CD. When this setting is terminated both in the CD and the deck, the CD enters PLAY and the deck enters CD REC.

At this time, the REC OUT SELECTOR B of the amplifier A-7X is fixed to the CD by the CCRS start signal.

When CD REC is performed where CCRS setting is completed (the CCRS LED lights), the input level of the deck is fixed and the REC VR is ignored.

In addition, in REC of other than CD, even when the CCRS LED lights, the normal recording (REC VR effective) is enterd.

iii) During CCRS setting (CCRS LED flickers.)

Decks ..... Every other key than the STOP key of deck B is inhibited (not accepted).

CD ..... Every other key than the STOP and OPEN/CLOSE keys is inhibited.

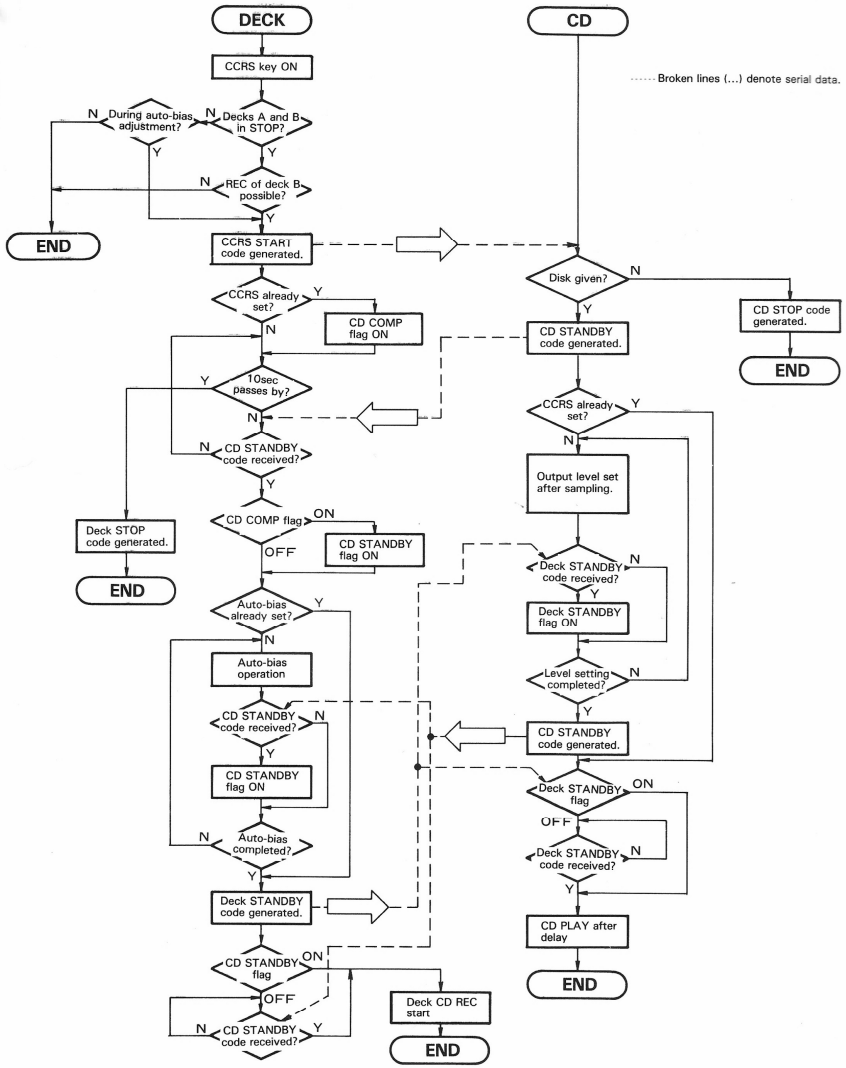
Amp ..... REC OUT B is fixed to CD.

iv) CCRS cancel conditions

1. When at least one deck is in adjustment
   - When the STOP key of deck B or the STOP or OPEN/CLOSE key of the CD player is pressed, the STOP code is generated in each of them. The CCRS mode is canceled by this code, and they both stop.
   - When the power of the CD player or the deck is turned OFF, the OFF reset is aplied. Thus, the POWER ON code is generated in each of them. The CCRS mode is thereby canceled and they stop.
2. After generating of the CCRS START code (at ON) in the deck, unless the CD STANDBY code is returned within 10sec, the CCRS mode is canceled as it is here assumed that no CD is given.
3. When the setting is completed
   - The CCRS mode is canceled by the OPEN or POWER ON code of the CD.

CIRCUIT DESCRIPTION

CCRS operation flowchart:



X-7WX

CIRCUIT DESCRIPTION

CCRS state transition table:

○---Goes out ●---Lights ⊗---Flickers

Current state		Deck operation					CD operation		
CCRS LED	AUTOB LED								
Deck		CCRS key	AUTO BIAS key	STOP key	EJECT button	POWER switch	OPEN/ CLOSE key	STOP key	POWER switch
CD									
○	○	⊗	⊗	○	⊗				
STOP		AUTO BIAS	AUTO BIAS						
STOP		SAMPLING							
⊗	⊗			○	○	Cannot be pressed	○	○	○	○
AUTO BIAS				STOP		STOP	STOP	OPEN	STOP	STOP
SAMPLING				STOP		STOP	STOP	OPEN	STOP	STOP
⊗	●			○	●	○ ○	○	●	○	● ○ ●
STOP						AUTO BIAS CLEAR	AUTO BIAS CLEAR			
SAMPLING				STOP		STOP	STOP	OPEN	STOP	STOP
●	⊗	⊗	⊗	●	⊗	● ○	Cannot be pressed	○	○	○	⊗ ● ⊗ ○ ⊗
AUTO BIAS				STOP		STOP				
STOP							CCRS CLEAR			CCRS CLEAR
●	●	●	●			● ○	○	○	○	● ○ ●
STOP		CD REC				AUTO BIAS CLEAR		CCRS CLEAR		CCRS CLEAR
STOP		PLAY						CCRS CLEAR		POWER OFF
●	●					○	○	●	●	○ ●
CD REC				STOP		STOP (POWER OFF)	STOP after ARM	STOP after ARM	STOP after ARM
PLAY							STOP & OPEN	STOP	STOP (POWER OFF)

CIRCUIT DESCRIPTION

Current state		Deck operation					CD operation		
CCRS LED	AUTOB LED								
Deck / CD		CCRS key	AUTO BIAS key	STOP key	EJECT button	POWER switch	OPEN/ CLOSE key	STOP key	POWER switch
●	○	⊗	⊗	●	⊗	○	○	○	○	○
STOP		AUTO BIAS	AUTO BIAS		EJECT	POWER OFF	CCRS CLEAR		CCRS CLEAR
STOP							CCRS CLEAR, OPEN		POWER OFF
○	●	⊗	●			○	○	○			
STOP					AUTO BIAS CLEAR	POWER OFF			
STOP		SAMPLING					OPEN		POWER OFF
○	●					○	○			
CD REC				STOP		STOP, POWER OFF	STOP after ARM	STOP after ARM	STOP after ARM
PLAY							OPEN	STOP	POWER OFF
●	○					○	○	○		○	○
CD REC				STOP		STOP, POWER OFF	STOP after ARM	STOP after ARM	STOP after ARM
PLAY							OPEN	STOP	POWER OFF

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CIRCUIT DESCRIPTION

3-6 Dubbing

Dubbing from deck A to deck B can be made in a single action by the DUB or H DUB key. The high-speed budding is made at about 2.7 times the normal speed.

During dubbing (high-speed dubbing), when the DUB (H DUB) key is pressed again, the AUTO REC MUTE is entered. Thus, a non-recorded section of 4sec (6sec) is created and then the REC PAUSE is entered.

When dubbing again, press the DUB (H DUB) key again.

During dubbing, when an operation key of deck A is pressed, deck A enters its corresponding mode, and deck B enters the REC PAUSE after AUTO REC MUTE.

In addition, when an operation key (PAUSE, REC) of deck B is pressed, the dubbing stops. Then, deck A stops and deck B enters its corresponding mode.

When the PAUSE key is pressed, the REC PAUSE is entered. The REC key is inhibited.

3-7 Test mode

This mode is used in checking the unit for practical operation or in checking the PC board jigs. TEST 1 for practical operation is set by connecting KSCAN5 and KEY RETURN 8 (test pins TPC and TPD) by a diode for small signal, and TEST 2 is set by connecting KSCAN5 and KEY RETURN 7 (no test pins) by a diode.

(1) TEST 1 operation specification

TEST 1, used basically for practical line operation, has the following functions:

i) Shortening the turn-on time at power ON

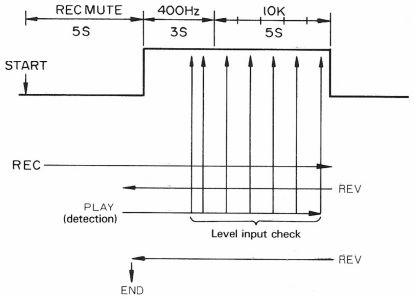
When the POWER switch is turned ON after the connection required for TEST 1, the initial key inhibit time is shortened from 3.5sec (normally) to 1sec. However, when playback is performed in this situation, shock noise may occur.

ii) Shortening the quick-reverse inhibit time

The quick reverse function is inhibited for about 10sec after the key input is finally accepted to prevent faulty operation around the tape end. This time is shortened to about 1sec.

iii) Checking the auto-bias operation

The auto-bias operation also takes about 50sec until it is terminated in usual operation. This time is shortened to about 25sec. More, when the operation is normal, the H DUB LED lights when it is terminated. (The input check is made only in one point in respect to each bias level.)



When the auto-bias operation terminates, another serial code is generated before deck B stops.

Name	HEX DATA	Meaning
A STOP	59H	The location at which 400Hz recording starts is not found out in the PLAY operation.
A PLAY	58H	Even when the sensitivity of the level detection amplifier is made HIGH, the output voltage does not become greater.
B PLAY	68H	In the normal sensitivity, the 400Hz level is not in the range of 4 < LV400 < 13. (1.72V < LV400 < 4.22 V)
DUBBING	6CH	The 10kHz level is not in the range of 400Hz level ±2 steps.
POWER ON	51H	OK!!

iv) CCRS check

When the CCRS is pressed in the test mode, the CCRS and NORMAL modes are set cyclically. When the CCRS mode is set, the CCRS LED lights. When the CCRS LED is lighting, when deck B is entered to the REC, recording is made with the input level fixed (FIX) and the REC VR is ignored.

CIRCUIT DESCRIPTION

(2) TEST 2 operation specification

The output port check is main.

i) Display check

When the TEST 2 mode is engaged, the LEDs are lit in order independent of any other operations.

This order of lighting is:

A REC → A PAUSE → DUB → H DUB → CCRS → AUTO BIAS → B REC →

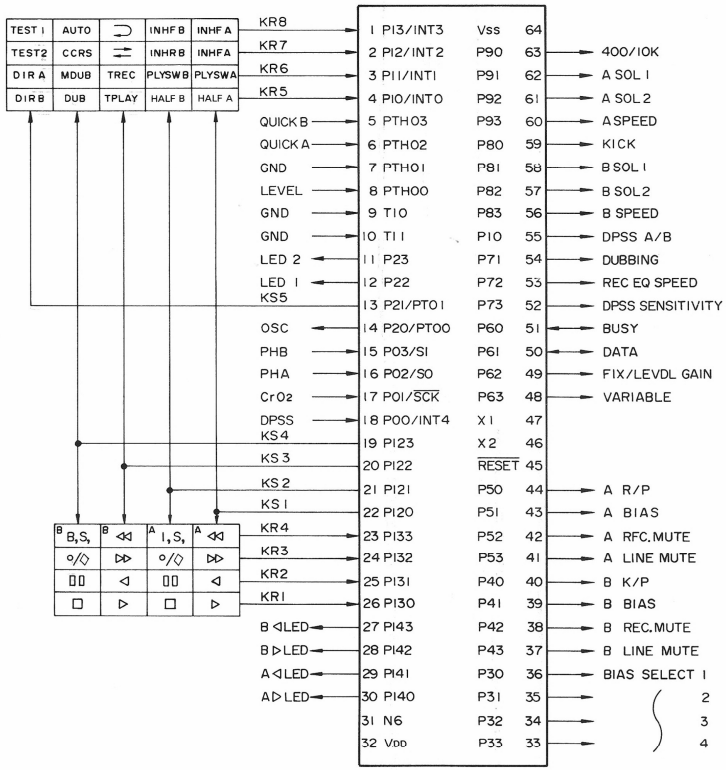
B PAUSE → A FWD → A RVS → B FWD → B RVS →

ii) Bias control port check

When the AUTO BIAS key is pressed, the bias control ports P30—P33 turn ON. However, differently from i), the bias changes only one step at one pressure of the key.

iii) CCRS check

Same as in **iv)** of TEST 1.



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CIRCUIT DESCRIPTION

Port assignment table

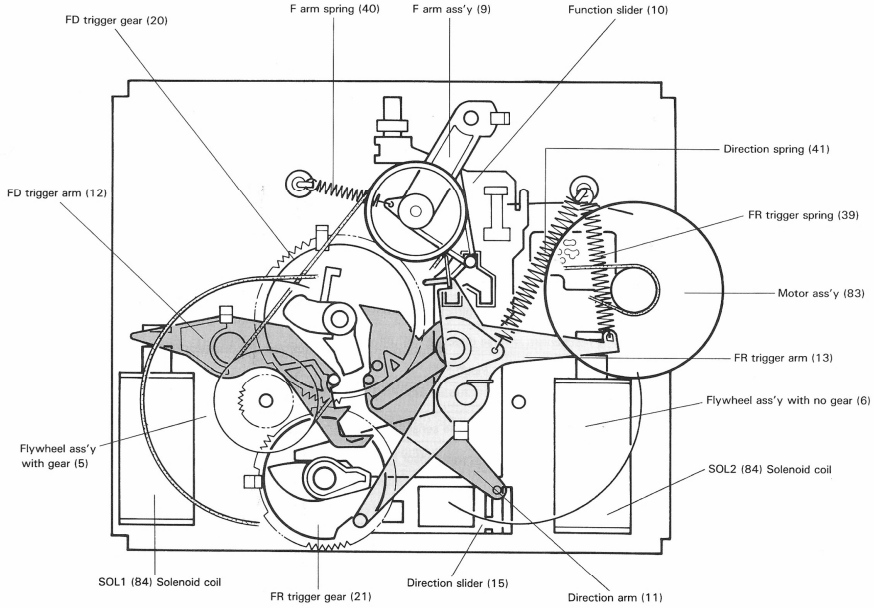
Port		Pin No.	I/O Mode	Active Mode	Function		
P0	0	18	I	H	DPSS interval-between-tunes detection signal input	H: with sound L: with no sound	DPSS
	1	17	I	L	70μsec tape detection	H: NORMAL L: HIGH POSITION	CrO_2
	2	16	I	—	Deck A mechanism rotation detection sensor input	Change of H to L or vice versa indicates that it is in rotation.	PHA
	3	15	I	—	Deck B mechanism rotation detection sensor input	Change of H to L or vice versa indicates that it is in rotation.	PHB
P1	0	4	I	L	Key return input KR5		
	1	3	I	L	Key return input KR6		
	2	2	I	L	Key return input KR7		
	3	1	I	L	Key return input KR8		
P2	0	14	O	—	400Hz/10kHz OSC output	"L" when OSC is in stop.	OSC
	1	13	O	L	Key scan output KS5		
	2	12	O	H	LED segment drive output 1 LED 1		
	3	11	O	H	LED segment drive output 2 LED 2		
P3	0	36	O	H	Bias select output 1		
	1	35	O	H	Bias select output 2		
	2	34	O	H	Bias select output 3		
	3	33	O	H	Bias select output 4		
P4	0	40	O	H	Deck B mechanism R/P select output	H: REC L: PLAY	B R/P
	1	39	O	H	Deck B mechanism bias output	H: B IAS ON L: BIAS OFF	B BIAS
	2	38	O	L	Deck B mechanism rec mute output	H: MUTE OFF L: MUTE ON	B RMUT
	3	37	O	L	Deck B mechanism line mute output	H: MUTE OFF L: MUTE ON	B LMUT
P5	0	44	O	H	Deck A mechanism R/P select output	H: REC L: PLAY	A R/P
	1	43	O	H	Deck A mechanism bias output	H: BIAS ON L: BIAS OFF	A BIAS
	2	42	O	L	Deck A mechanism rec mute output	H: MUTE OFF L: MUTE ON	A RMUT
	3	41	O	L	Deck A mechanism line mute output	H: MUTE OFF L: MUTE ON	A LMUT
P6	0	51	I/O	H	System control serial I/O BUSY		
	1	50	I/O	H	System control serial I/O DATA		
	2	49	O	H	Deck B mechanism line input bracket and detection sensitivity selection	H: ON LOW L: OFF HIGH	
	3	48	O	H	Deck B mechanism line input varying signal	H: ON L: OFF	
P7	0	55	O	H	DPSS A select signal	H: A L: B	
	1	54	O	H	Dubbing signal	H: DUBBING L: NORMAL	
	2	53	O	H	Rec EQ select signal	H: HIGH SPEED L: NORMAL SPEED	
	3	52	O	L	DPSS amp sensitivity selection	H: LOW L: HIGH	

CIRCUIT DESCRIPTION

Port		Pin No.	I/O Mode	Active Mode	Function
P8	0	59	O	H	Mechanism solenoid kick output
	1	58	O	H	Deck B mechanism solenoid 1 drive
	2	57	O	H	Deck B mechanism solenoid 2 drive
	3	56	O	H	Deck B mechanism HIGH SPEED
P9	0	63	O	H	400Hz/10kHz filter selection H: 400Hz L: 10kHz
	1	62	O	H	Deck A mechanism solenoid 1 drive
	2	61	O	H	Deck A mechanism solenoid 2 drive
	3	60	O	H	Deck A mechanism HIGH SPEED
P12	0	22	O	L	Key scan output 1 KS1
	1	21	O	L	Key scan output 2 KS2
	2	20	O	L	Key scan output 3 KS3
	3	19	O	L	Key scan output 4 KS4
P13	0	26	I	L	Key return input 1 KR1
	1	25	I	L	Key return input 2 KR2
	2	24	I	L	Key return input 3 KR3
	3	23	I	L	Key return input 4 KR4
P14	0	30	O	L	Deck A mechanism forward direction LED drive
	1	29	O	L	Deck A mechanism reverse direction LED drive
	2	28	O	L	Deck B mechanism forward direction LED drive
	3	27	O	L	Deck B mechanism reverse direction LED drive
PTH	0	8	I		Auto-bias level detection input
	1	7	I		N.C.
	2	6	I		Deck A mechanism quick-reverse sensor input
	3	5	I		Deck B mechanism quick-reverse sensor input

MECHANISM DESCRIPTION

This mechanism is an improvement of the mechanism (X92-1070-00) used in X-7WS, KX-949W and KX-95W. A figure ( ) in a following drawing denotes a reference number in the parts list.
Drawings are rear perspective view, unless otherwise specified.



Parts layout

Driving Power	:	More than 100g·cm
Take up Torque	:	30 ~ 75g·cm
FF. REW Torque	:	75 ~ 140g·cm
Back Tension Torqu	:	2 ~ 4g·cm

MECHANISM DESCRIPTION

1. OUTLINE

Rotation transmission : Rotation is transmitted from the motor as indicated by the arrow (➡) in Fig. 1.

FD trigger gear : For PLAY and direction reversion. Drives the sub chassis and the direction arm.

FD trigger arm : For PLAY and direction reversion. Driven by the solenoid 1 to control the FD trigger gear.

FR trigger gear : For FF and REW. Drives the function slider.

FR trigger arm : For FF and REW. Driven by the solenoid 2 to control the FR trigger gear.

Direction arm : For direction reversion. Drives the direction slider.

Direction slider : For direction reversion. Controls the head, pinch roller and switch.

Function slider : For FF and REW. Controls the F arm ass'y.

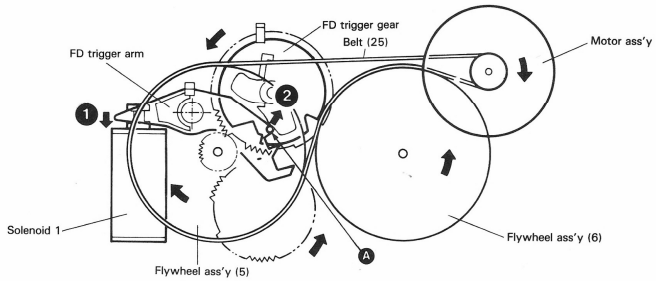


Fig. 1 Transmission of rotation

2. OPERATION IN EACH MODE

2-1 Forward play (FWD PLAY) operation (Figs. 1 and 2)

When the PLAY key is pressed, the PLAY signal is transmitted from the microprocessor. Thus, the solenoid 1 is attracted and released once to pull the FD trigger arm.

The FD trigger arm rotates in the direction of arrow ❷ (Fig. 1) and the boss Ⓐ is disengaged from the protrusion of the FD trigger gear so that the FD trigger gear is engaged with the flywheel gear and rotated in the direction of the arrow (Fig. 2).

Then, the cam (A) located at the rear of the FD trigger gear pushes upwards the tongue of the sub chassis (802) to lift the head. At the same time, the cams on the rear of the FD trigger gear controls the direction arm to move the direction slider in the FWD direction (arrow ❶) to select the FWD side record/erase head and pinch roller (arrows ❷, ❸, ❹ and ❺) (Fig. 2).

During this time, the solenoid 1 is attracted and released again.

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MECHANISM DESCRIPTION

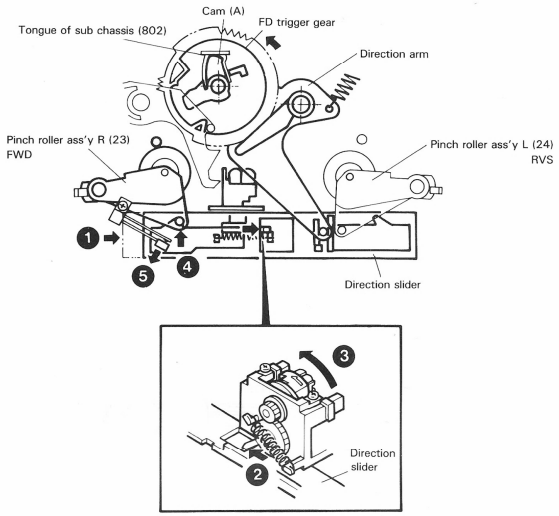

Fig. 2 Status of forward play

2-2 Reverse play (RVS PLAY) operation (Fig. 3)

By the RVS PLAY signal, the solenoid 1 is attracted to rotate the FD trigger arm. Thereby, the stopper of the FD trigger gear is released from the FD trigger arm and starts rotating.

The solenoid 1 is kept as it is for a certain time (about 1/2 rotation of the gear), after which it is released.

By the cam on the rear of the gear, the direction arm rotates to move the direction slider in the RVS direction (arrow ❶) (Fig. 3). As the head (sub chassis) rises, the pin of the pinch roller (L) is put into the concave section Ⓑ of the direction slider so that the pinch roller (L) presses against its corresponding capstan only in the RVS side.

Then, the head rotates in the direction of arrow ❷, the reverse mode switch is turned ON due to the motion of the section indicated by arrow ❸ so that the reverse play mode is entered.

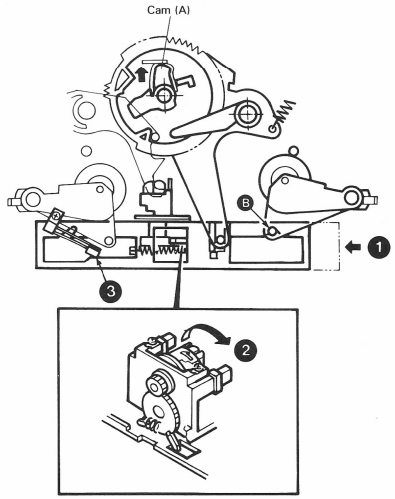

Fig. 3 Status of reverse play

MECHANISM DESCRIPTION

2-3 FF operation (Figs. 4 and 5)

In the FF operation, the solenoid 2 is attracted twice, after which it is held ❶ . When the solenoid 2 comes to the ON position, attracted, the FR trigger arm rotates in the direction of arrow ❷ so that the FR trigger gear rotates in the direction of arrow ❸ (Fig. 4).

The FR trigger gear starts rotation due to engagement with the flywheel gear and the function slider is pushed upwards in the direction of arrow ❹ by the cam (B) located on the rear. The F arm ass'y is always pulled in the direction of arrow ❺ by the F arm spring (40). At this time, as the solenoid 2 is in the OFF position, the pin (a) of the F arm ass'y enters into the groove F of the function slider in a natural manner. (Fig. 4)

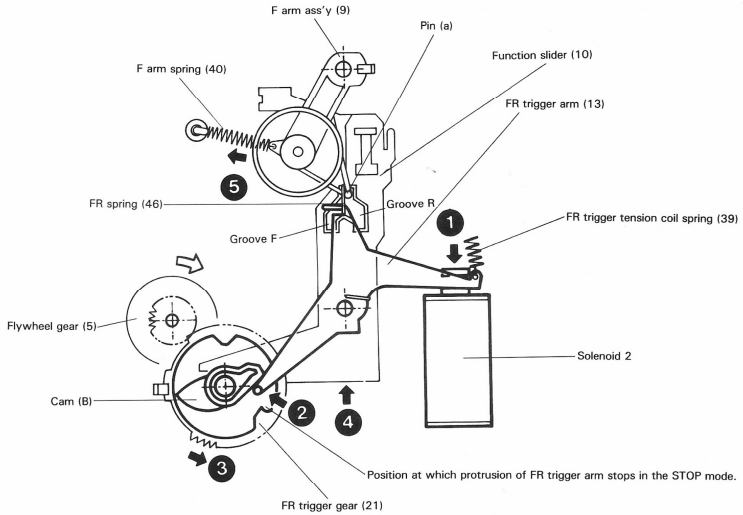

Fig. 4 When FR trigger gear starts rotating

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MECHANISM DESCRIPTION

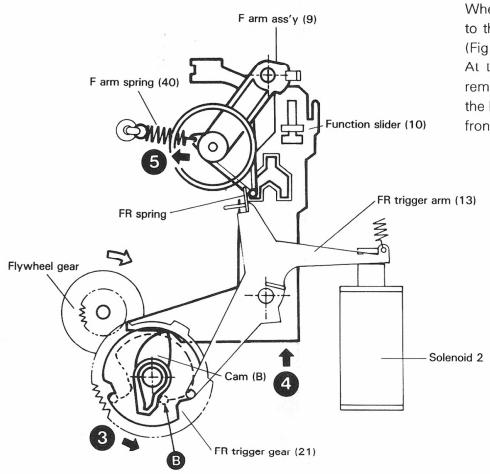


Fig. 5 Right before solenoid 2 is held

When the pin (a) is put into the groove, the solenoid 2 comes to the ON position again and is held in this position as it is. (Fig. 5)

At this time, the FR spring attached to the FR trigger arm remains bent. The FR trigger gear is held by the touching of the FR trigger arm pin against the section Ⓑ of the cam in the front, in which state the FF mode is entered.

2-4 Rewind (REW) operation (Fig. 6)

In the rewind operation, the solenoid 2 is attracted once and held. Thus, the FR trigger arm is moved to the direction of arrow ❷ . By the FR spring, the F arm ass'y moves to the direction of arrow ❺ and the pin (a) is put into the groove R of the function slider. When the FR trigger gear is held by the pin of the FR trigger arm, the rewind mode is entered.

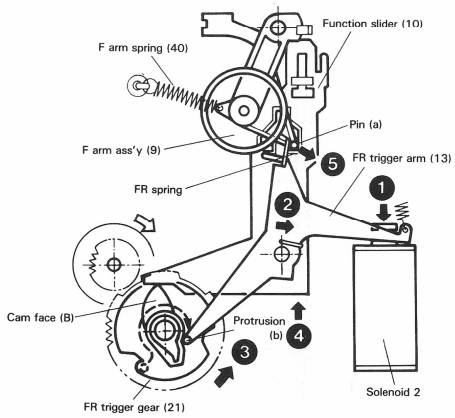


Fig. 6 Rewind mode

MECHANISM DESCRPTION

2-5 DPSS (Direct Program Search System) operation, and cue/review (REV) operation (Fig. 7)

In the DPSS operation, on the attracting timing of the solenoids 1 and 2, the head is put away from the tape and also the pinch roller is released from the capstan. The solenoid 1 is attracted twice, after which it is held.

The FD trigger gear is locked by the cam (B) and the FD trigger arm pin at the position at which it rotates slightly more than in the normal forward or reverse play.

In this position, the sub chassis lowers slightly than in the PLAY position, in which state the head and the pinch roller are put away in the direction of arrow ❸.

Then the solenoid 2 is attracted. Thus, the tape is wound at high speed by the FF or REW operation and the interval between tunes is searched for.

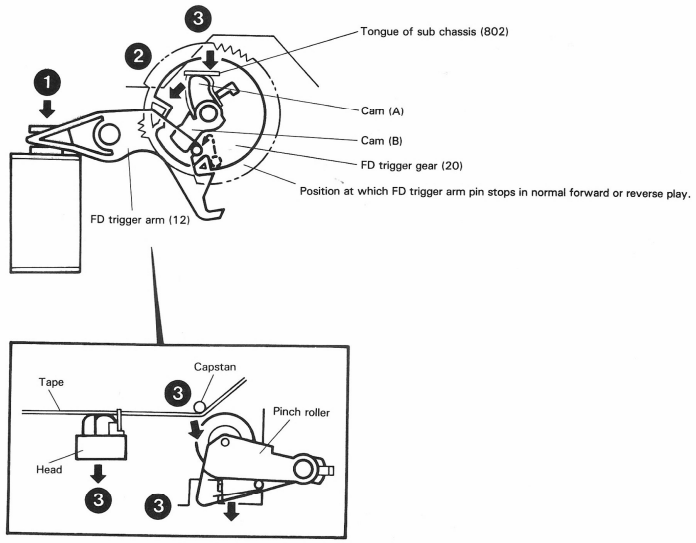
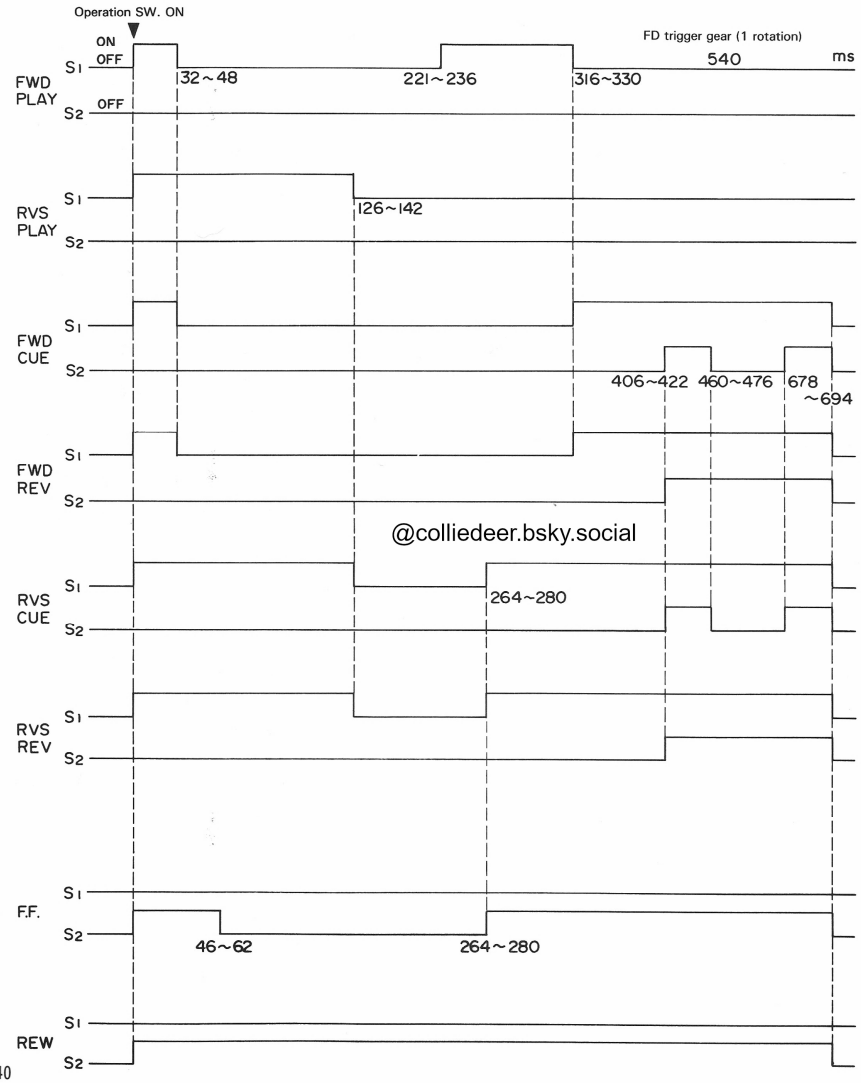


Fig. 7 DPSS operation

X-7WX

MECHANISM DESCRIPTION

3. Solenoid timing chart



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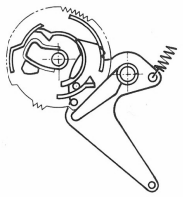
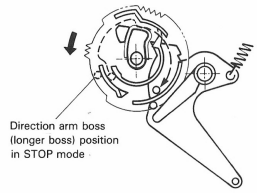
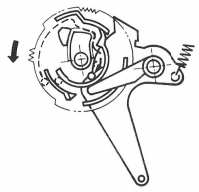
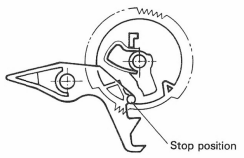
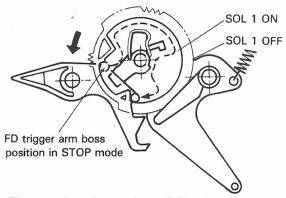
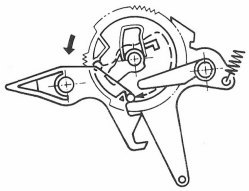
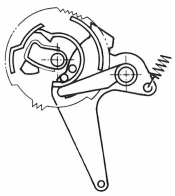
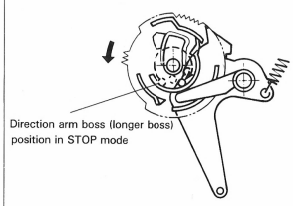
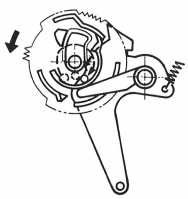
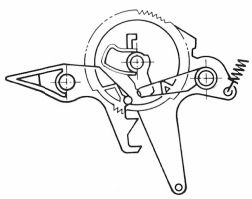
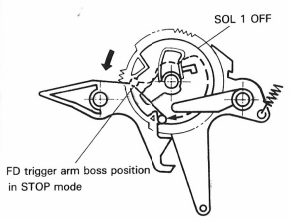
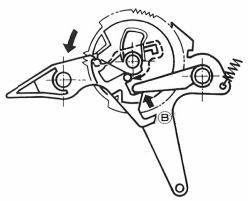
Description of FD Trigger Gear, FD Trigger Arm and FR Trigger Arm Position During Operation (1)

Description \ Mode	FWD STOP Mode	FWD STOP → FWD PLAY	Path from FWD STOP → REV PLAY
Relationship of positions of cam surfaces and direction arm projection when the FD trigger is seen through the rear of the mechanism.		 Figure showing FWD mode direction arm fixed position when SOL 1 is drawn out, the flywheel drive gear and FD trigger gear are engaged, and the FD trigger gear is rotated in the direction of the arrow.	 Direction arm projection changes from the outer to the inner REV direction cam surface when SOL 1 is drawn out.
Relationship of positions of projections and FD trigger arm when the FD trigger is seen from the rear of the mechanism.		 Figure showing when SOL 1 is drawn out, the FD trigger arm projection moves from the stop position in the STOP mode, the rotation of the flywheel in the direction of the arrow is transmitted to the FD trigger gear, the FD trigger gear rotates approximately one full turn and is fixed at the other FD trigger gear projection position.	 The FD trigger arm projection path moves from the STOP to the PLAY position and is fixed here.

Description of FD Trigger Gear, FD Trigger Arm and FR Trigger Arm Position During Operation (2)

Description \ Mode	RVS STOP Mode	RVS STOP → RVS PLAY	RVS STOP → RVS PLAY
Relationship of positions of cam surfaces and direction arm projection when the FD trigger is seen through the rear of the mechanism.	 Unlike the FWD mode, the direction arm projection is positioned at the FD trigger gear inner cam surface.	 The direction arm projection is held along the FD trigger gear inner cam surface.	 Direction arm held in RVS position by FD trigger arm.
Relationship of positions of projections and FD trigger arm when the FD trigger is seen from the rear of the mechanism.	 FD trigger arm projection fixed at the STOP position.	 FD trigger arm fixed at the PLAY position. The broken line shows the FD trigger arm projection path.	 When switching from the RVS STOP to the RVS PLAY mode, the hook inside the FD trigger arm pushes the direction arm in the direction of arrow B and holds it there, fixing the path of the direction arm projection in the

ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	CASSETTE TAPE DECK SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
CASSETTE DECK SECTION 1 REC/PLAY HEAD		TAPE: NORMAL, DOLBY: OFF, INPUT: LINE				0dBs = 0.775V	
[1]	DEMAGNETIZATION	–	–	POWER: OFF Remove the cassette door.	REC/PLAY head	Demagnetize the REC/PLAY head with a head demagnetizer.	
[2]	CLEANING	–	–	PLAY	REC/PLAY head erase head, capstan, pinch roller.	Clean the REC/PLAY head erase head, capstan and pinch roller using a cotton swab slightly damped with alcohol.	
[3]	AZIMUTH	MTT-114 10kHz,-10dB	(2),(4),(5)	PLAY	Azimuth adjustment screw	Maximum output.	
II PC BOARD (X29-1800-00)							
<i>	TAPE SPEED (HI SPEED)	MTT-111 3kHz	(2),(4),(6)	Connect a jumper between GND and TP.A(TP.B) PLAY	DECK A: VR3 DECK B: VR4	Adjust the tape speed so that a 8100Hz signal is produced at the center of the tape.	
<ii>	TAPE SPEED (NORMAL)	MTT-111 3kHz	(2),(4),(6)	PLAY	DECK A: VR1 DECK B: VR2	Adjust the tape speed so that a 3kHz signal is produced at the center of the tape.	
III PC BOARD (X87-1150-00),(X87-1040-04/X87-1140-00),(X28-1790-00)							
<1>	PLAYBACK LEVEL	(a) MTT-150 400Hz(200nWb) (b) MTT-256 315Hz(160nWb) (c) MTT-256U 315Hz(220nWb)	(2),(4)	PLAY	(X87-1150) DECK A(TD1): VR2(L) VR1(R) DECK B(TD2): VR2(L) VR1(R)	Output level: -6.0dBs Output level: -9.0dBs Output level: -5.0dBs	
<2>	BIAS CURRENT	(1),(3) 1kHz,-30dBs 10kHz,-30dBs	(2),(4)	Adjust REC level volume so that the REC monitor output becomes -29dBs at 1kHz, then record and reproduce signal of 1kHz and 10kHz in alaternation.	(X28-1790) DECK A: VR1(L) VR2(R) DECK B: VR3(L) VR4(R)	Record 1kHz and 10kHz in alternation and adjust the variable resistors which control the bias current so that the same playback level is obtained.	
<3>	RECORD LEVEL	(1),(3) 1kHz,-10dBs	(2),(4)	Record and reproduce a 1kHz signal under the conditions set in <2>.	(X87 1040/X87 1140) DECK A(DT3): VR1(L) VR2(R) DECK B(DT4): VR1(L) VR2(R)	Adjust the variable resistors so that a playback level of -9dBs is obtained.	
IV PC BOARD (X28-1790-00)							
<4>	BIAS OSCILLATING FREQUENCY	Load the non-recorded tapes on Deck A and B.	Connect the frequency counter between TP6 and GND on Deck A, between TP5 and GND on Deck B.	REC	DECK A: L7 DECK B: L8	Adjust so that the frequency counter shows 105kHz.	(a)
<5>	BIAS TRAP	–	DECK A: TP1(L) TP2(R) DECK B: TP3(L) TP4(R) Connect the AC voltmeter to Deck A and B as above.	METAL. REC	DECK A: L3 (L) L4 (R) DECK B: L11(L) L12(R)	Minimum (point)	(b)
<6>	BIAS LEAK	Load a non-recorded tape on Deck A	(4)	Load a metal tape, and dub in a high-speed mode.	L1(L),L2(R)	Minimum (Point)	

X-7WX

REGLAGES

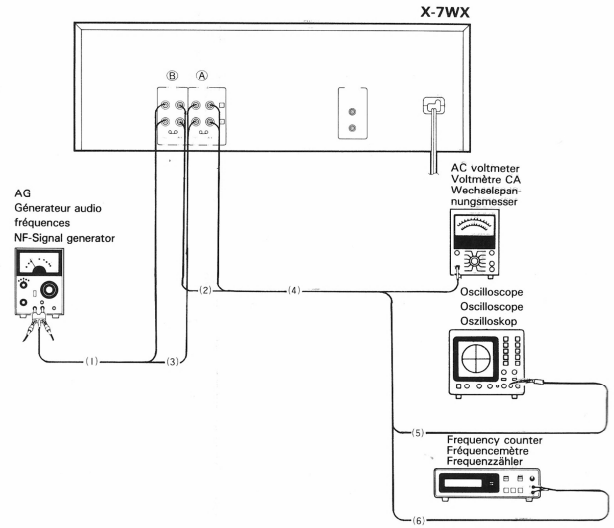
N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU MAGNETO -PHONE A CASSETTE	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
SECTION DU MAGNETOPHONE I TETE D'ENREGISTREMENT/LECTURE		TAPE: NORMAL, DOLBY: OFF, ENTREE: LINE				0dBs = 0.775V	
[1]	DEMAGNETISATION	–	–	POWER: OFF Eloigner la porte.	Tete D'ENREGISTREMENT/ LECTURE	Demagnetiser la tete D'ENREGISTREMENT/LECTURE avec un demagnetiseur de tete.	
[2]	NETTOYAGE	–	–	PLAY	Tete D'ENREGISTREMENT/ LECTURE tete d'effacement, cabestan, galetpresseur.	Nettoyer la tete D'ENREGISTREMENT/LECTURE la tete d'effacement, le cabestan et le galetpresseur avec un coton-tige legerement imbibe d'alcool.	
[3]	AZIMUT	MTT-114 10kHz,-10dB	(2),(4),(5)	PLAY	Vis d'azimut	Sortie maximer.	
II PLAQUE IMPRIMEE (X29-1800-00)							
<i>	VITESSE DE DEFILEMENT (HI SPEED)	MTT-111 3kHz	(2),(4),(6)	Connecter un cablage entre les GND et TP.A(TP.B) PLAY	DECK A: VR3 DECK B: VR4	Regler la vitesse de bande de facon qu'un signal de 8100Hz soit produit au centre de la bande.	
<ii>	VITESSE DE DEFILEMENT (NORMAL)	MTT-111 3kHz	(2),(4),(6)	PLAY	DECK A: VR1 DECK B: VR2	Regler la vitesse de bande de facon qu'un signal de 3kHz soit produit au centre de la bande.	
III PLAQUE IMPRIMEE (X87-1150-00),(X28-1790-00),(X87-1040-04/X87-1140-00)							
<1>	NIVEAU DE LECTURE	(a) MTT-150 400Hz(200nWb) (b) MTT-256 315Hz(160nWb) (c) MTT-256U 315Hz(220nWb)	(2),(4)	PLAY	(X87-1150) DECK A(TD1): VR2(G) VR1(D) DECK B(TD2): VR2(G) VR1(D)	Niveau de sortie: -6.0dBs Niveau de sortie: -9.0dBs Niveau de sortie: -5.0dBs	
<2>	COURANT DE POLARISATION	(1),(3) 1kHz,-30dBs 10kHz,-30dBs	(2),(4)	Regler REC de volume de niveau facon que la sortie de moniteur REC soit de -29dBs a 1kHz, puis en registrer et reproduire des signaux dg 1kHz et 10kHz en alternance.	(X28-1790) DECK A: VR1(G) VR2(D) DECK B: VR3(G) VR4(D)	Enregistrer un signal de 1kHz et 10kHz en alternance et ajuster les resistances variables qui commandent le courant de polarite de facon a obtenir le meme niveau de lecture.	
<3>	NIVEAU D'ENREGISTREMENT	(1),(3) 1kHz,-10dBs	(2),(4)	Enregistrer et reproduire un signal de 1kHz dans les conditions precisees en <2>.	(X87-1040/X87-1140) DECK A(DT3): VR1(G) VR2(D) DECK B(DT4): VR1(G) VR2(D)	Ajuster les resistances variables de facon a obtenir un niveau de lecture de -9dBs.	
IV PLAQUE IMPRIMEE (X28-1790-00)							
<4>	FREQUENCE D'OSCILLATION DE POLARISATION	Mettre en place des cassettes non enregistrees dans les platines A et B.	Raccorder le compteur de frequence enter TP6 et GND de la platine A, enter TP5 et GND de la platine B.	Enregistrement	DECK A: L7 DECK B: L8	Regler de maniere a ce que le compteur de frequence indique 105kHz.	(a)
<5>	ELIMINATEUR DE POLARISATION	–	DECK A: TP1(G) TP2(D) DECK B: TP3(G) TP4(D) Raccorder le voltmetre CA aux platines A et B comme ci-dessus.	Metal, enregistrement	DECK A: L3(G) L4(D) DECK B: L11(G) L12(D)	Minimum (point)	(b)
<6>	FUITE DE POLARISATION	Mettre en place une cassette non enregistree dans la platine A	(4)	Mettre en place unebande metal et copier en mode de vitesse elevee.	L1(G),L2(D)	Minimum (point)	

ABGLEICH

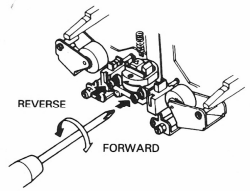
NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	KASSETTENGERÄT-EINSTELLUNG	ABGLEICH PUNKTE	ABGLEICHEN FÜR	ABB.
CASSETTEN-DECK-ABTEILUNG TAPE: NORMAL, DOLBY: OFF, EINGANG: LINE						0dBs = 0.775V	
I AUFNAHME/WIEDERGABE-KOPF							
[1]	ENTMAGNETI-SIERUNG	–	–	POWER: OFF Den Kassettenfach deckel oben herausziehen.	AUFNAHME/ WIEDERGABE-Kopf	Entmagnetisierung von dem AUFNAHME/WIEDERGABE-Kopf mit einem Tonkopf Entmagnetisierungsdrossel.	
[2]	REINIGUNG	–	–	PLAY	AUFNAHME/ WIEDERGABE-Kopf Loschkopf, Tonwelle, Andruckrolle.	AUFNAHME/WIEDERGABE-Kopf, Loschkopf, Tonwelle und Andruckrolle mit einem leicht mit Alkohol befeuch teten Wattebausch reinigen.	
[3]	AZIMUT-EINSTELLUNG	MTT-114 10kHz.-10dB	(2).(4).(5)	PLAY	Azimut-Einstellschraube	Maximal Ausgang.	
II GEDRUCKTE SCHALTPLATTE (X29-1800-00)							
<i>	BANDGESCH-WINDIGKEIT (HI SPEED)	MTT-111 3kHz	(2).(4).(6)	Einen Schaltdraht zwischen GND und TP.A(TP B) anschließen. PLAY	DECK A: VR3 DECK B: VR4	Die Bandgeschwindigkeit so justieren, daß ein 8100Hz Signal auf der Mitte des Bands erzeugt wird.	
<ii>	BANDGESCH-WINDIGKEIT (NORMAL)	MTT-111 3kHz	(2).(4).(6)	PLAY	DECK A: VR1 DECK B: VR2	Die Bandgeschwindigkeit so justieren, daß ein 3kHz Signal auf der Mitte des Bands erzeugt wird.	
III GEDRUCKTE SCHALTPLATTE (X87-1150-00),(X28-1790-00),(X87-1040-014/X87-1140-00)							
<1>	WIEDERGABE-PEGEL	(a) MTT-150 400Hz(200nWb)	(2).(4)	PLAY	(X87-1150) DECK A(TD1): VR2(L) VR1(R)	Ausgangspegel: -6.0dBs	
		(b) MTT-256 315Hz(160nWb)				Ausgangspegel: -9.0dBs	
		(c) MTT-256U 315Hz(220nWb)			DECK B(TD2): VR2(L) VR1(R)	Ausgangspegel: -5.0dBs	
<2>	LEERLAUFSTROM	(1).(3) 1kHz.-30dBs 10kHz.-30dBs	(2).(4)	REC so Pegel Lautstarke justieren, daß der REC Monitorausgang -29dBs bei 1kHz wird, und danach abwechselnd Signal von 1kHz und 10kHz aufnehmen und wiedergeben.	(X28-1790) DECK A: VR1(L) VR2(R) DECK A: VR3(L) VR4(R)	Signale von 1kHz und 10kHz abwechselnd aufnehmen und die Regelwiderstände, die den Vormagnetisierugsstrom regeln, so justieren, daß der gleiche Wiedergabepegel erzielt wird.	
<3>	AUFNAHMEPEGEL	(1).(3) 1kHz.-10dBs	(2).(4)	Ein 1kHz Signal unter den in Punkt <2> beschriebenen Bedingungen aufnehmen und reproduzieren.	(X87-1040/X87-1140) DECK A(TD3): VR1(L) VR2(R) DECK B(DT4): VR1(L) VR2(R)	Die Regelwiderstande so justieren, daß ein wiedergabepegel von -9dBs erzielt wird.	
IV GEDRUCKTE SCHALTPLATTE (X28-1790-00)							
(1)	VORMAGNETISIERUNGS OSZILLATIONS-FREQUENZ	Unbespielte Kassetten in Deck A und B einsetzen.	Den Frequenzzahler zwischen TP6 und GND von Deck A und zwischen TP5 und GND von Deck B anschließen.	REC	DECK A: L7 DECK B: L8	So einstellen, daß 105kHz auf dem Frequenzzahler angezeigt wird.	(a)
(2)	VORMAGNETISIE-RUNGSFALLE	–	DECK A: TP1(L) TP2(R) DECK B: TP3(L) TP4(R) Den Wechselstrom Voltmeter wie oben an Deck A und B anschließen.	METAL, REC	DECK A: L3 (L) L4 (R) DECK B: L11(L) L12(R)	Minimum (Punkt)	(b)
(3)	VORMAGNETISIE-RUNGSSTREUUNG	Eine unbespielte kassette in Deck A einsetzen.	(4)	Eine Metallband-kassette einsetzen und mit hoher Geschwindigkeit uberspielen.	L1(L).L2(R)	Minimum (Punkt)	

ADJUSTMENT/REGLAGES/ABGLEICH

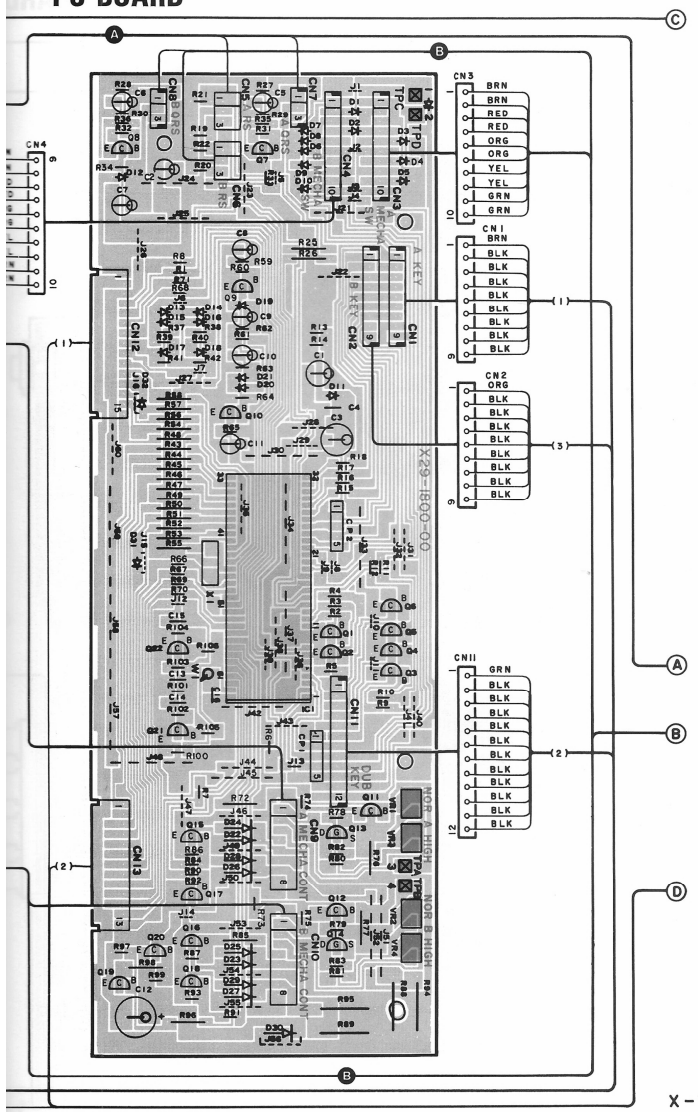
SYSTEM CONNECTIONS



AZIMUTH ADJUSTMENT SCREW



PC BOARD



(X29-1800-00)

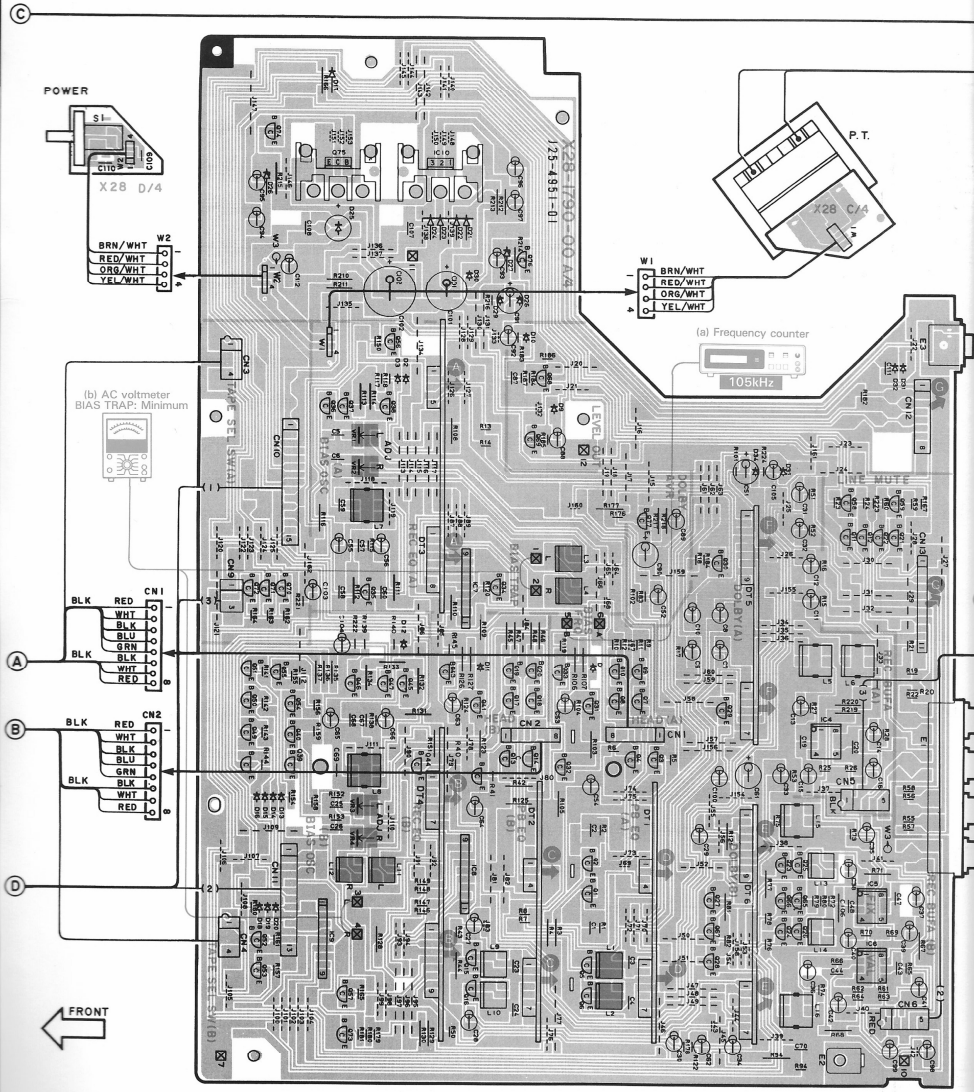
IC1

7,10,64	0V
32	5.2V

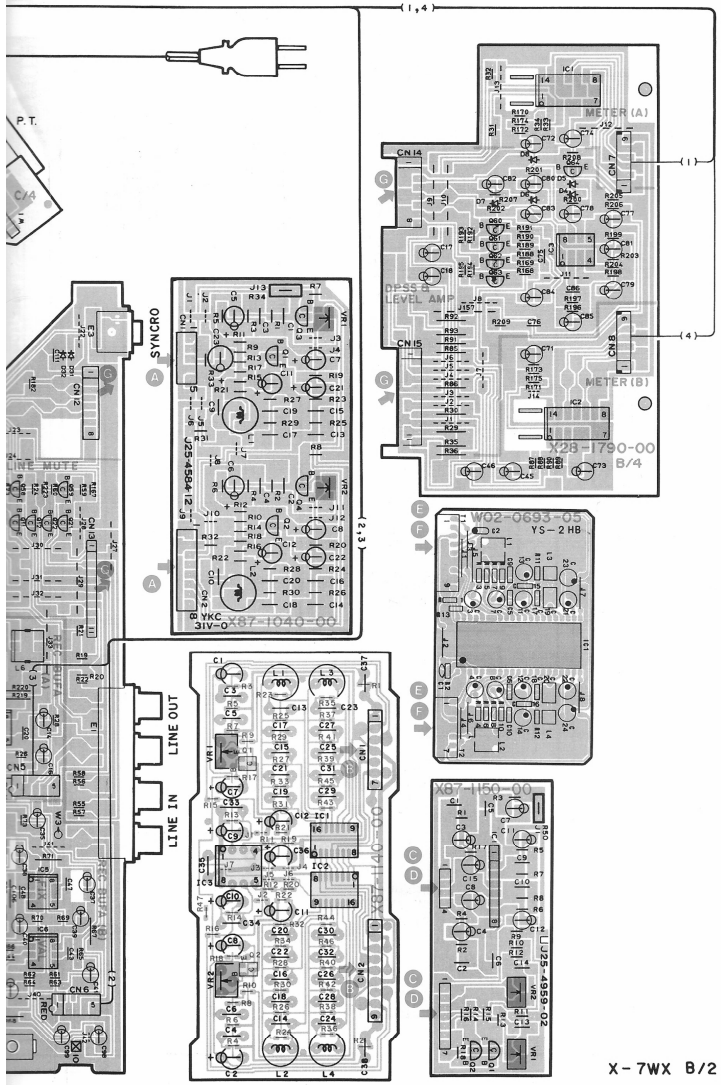
X-7WX A/2

Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD



PC BOARD



(X28-1790-21) (A/4)

IC5

6, 7	9V
8	18V

IC6

8	18V

IC10

1	31V
2	0V
3	18V

IC4

1 – 3	9V
4	0V
5 – 7	9V
8	18V

Q74

E	—
C	19V
B	—

Q76

E	8V
C	14V
B	—

Q75

E	14V
C	19V
B	—

Q77

E	14V
C	18V
B	—

(X28-1790-21) (B/4)

IC1, 2

6, 7	0V
8	14V

IC3

2	9V
4	0V
8	18V

(X87-1150-01)

IC1

1	1.3V
2	0.8V
3	3.6V
4	13.2V
5	0V
6	3.6V
7	0.8V
8	1.3V

(X87-1150-00)

IC1

1	1.3V
2	0.8V
3	3.6V
4	13.2V
5	0V
6	3.6V
7	0.8V
8	1.3V

(W02-0693-05)

IC1

42	14V

(W02-0693-05)

IC1

42	14V

(X87-1140-00)

Q1, 2

E	0V
C	0V
B	0V

IC3

1 – 3	9V
4	0V
5 – 7	9V
8	18V

X-7WX B/2

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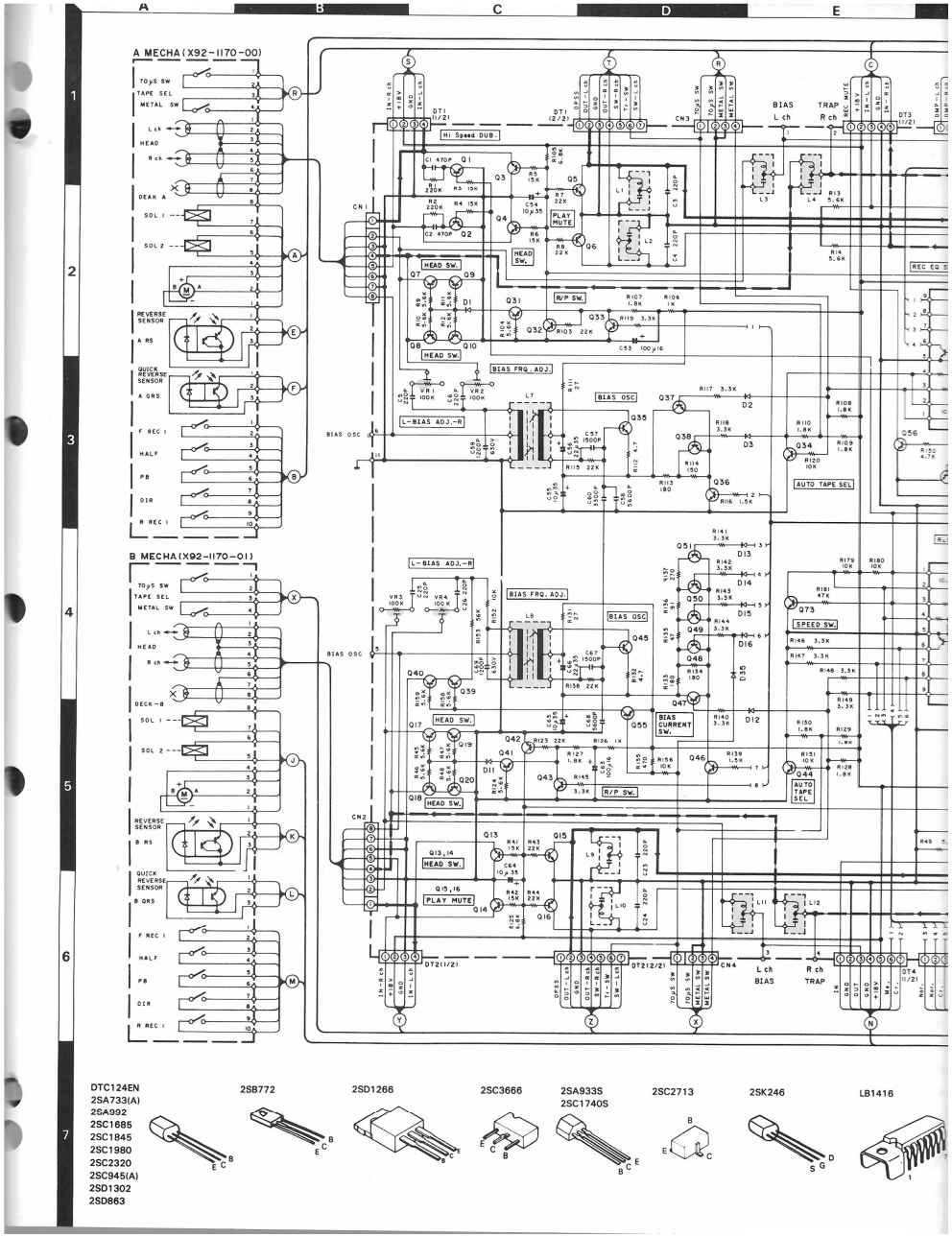
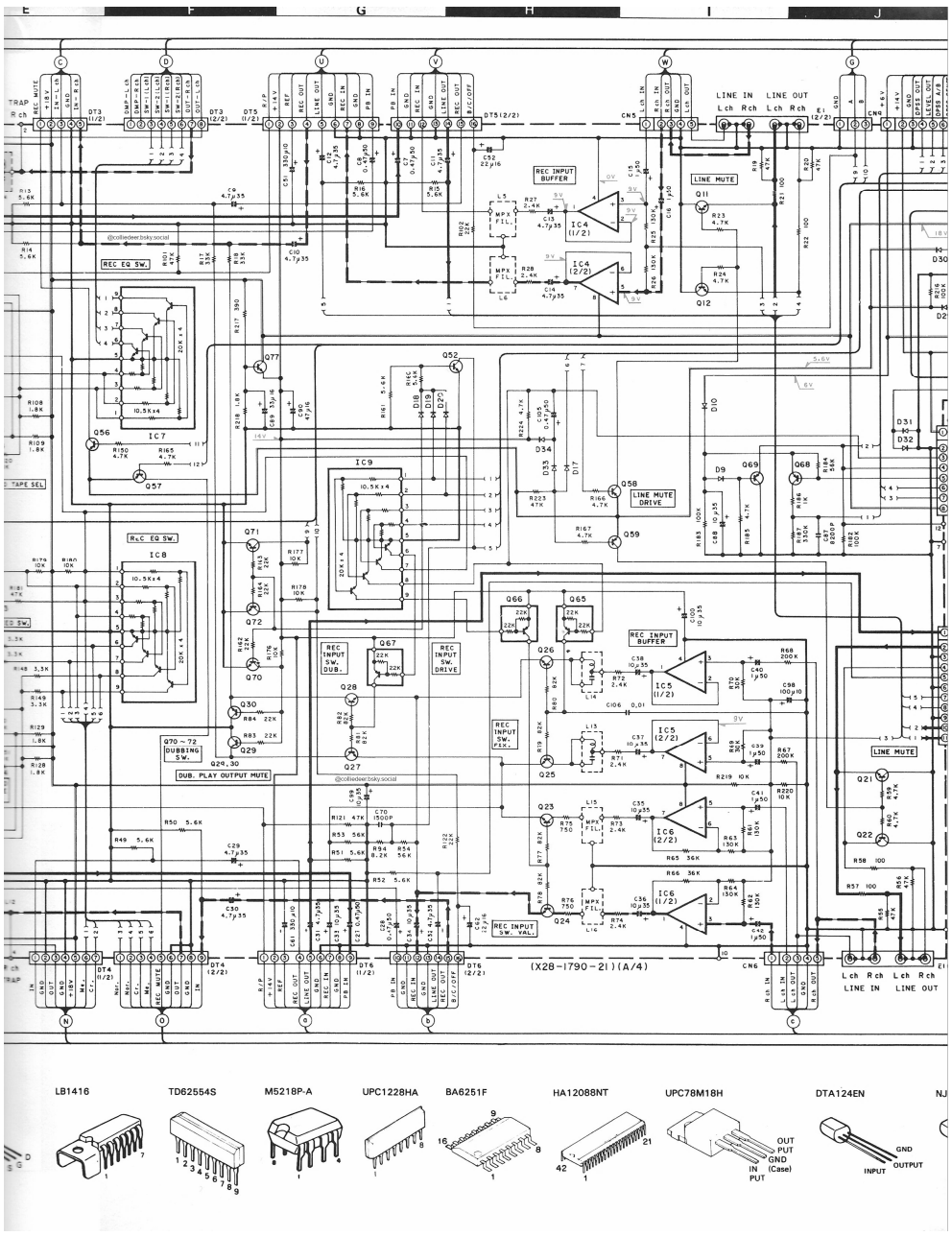
Refer to the schematic diagram for the values of resistors and capacitors.





DTC124EN
2SA733(A)
2SA992
2SC1685
2SC1845
2SC1980
2SC2320
2SC945(A)
2SD1302
2SD863

2SB772

2SD1266

2SC3666

2SA933S
2SC1740S

2SC2713

2SK246

LB1416

LB1416

TD62554S

M5218P-A

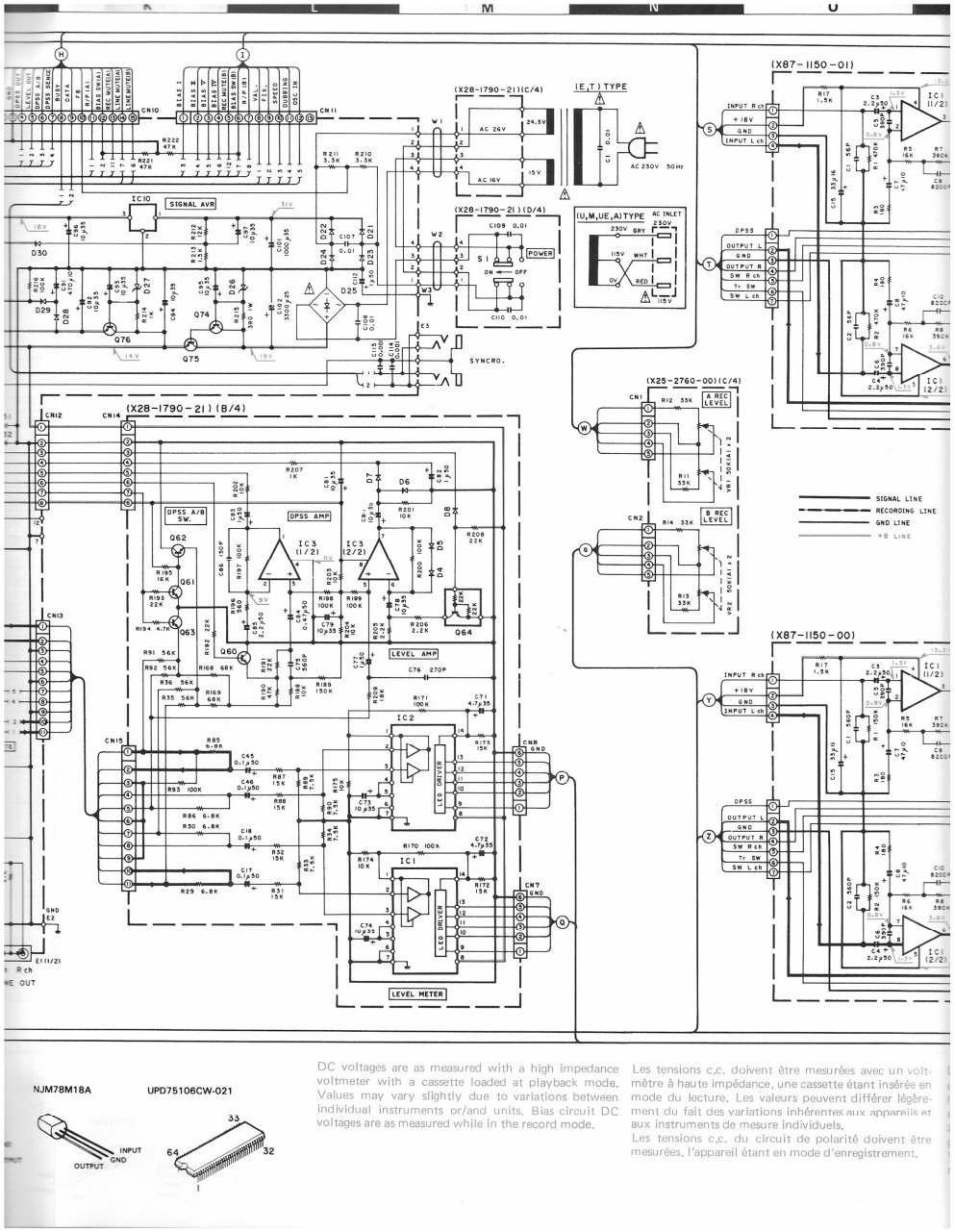
UPC1228HA

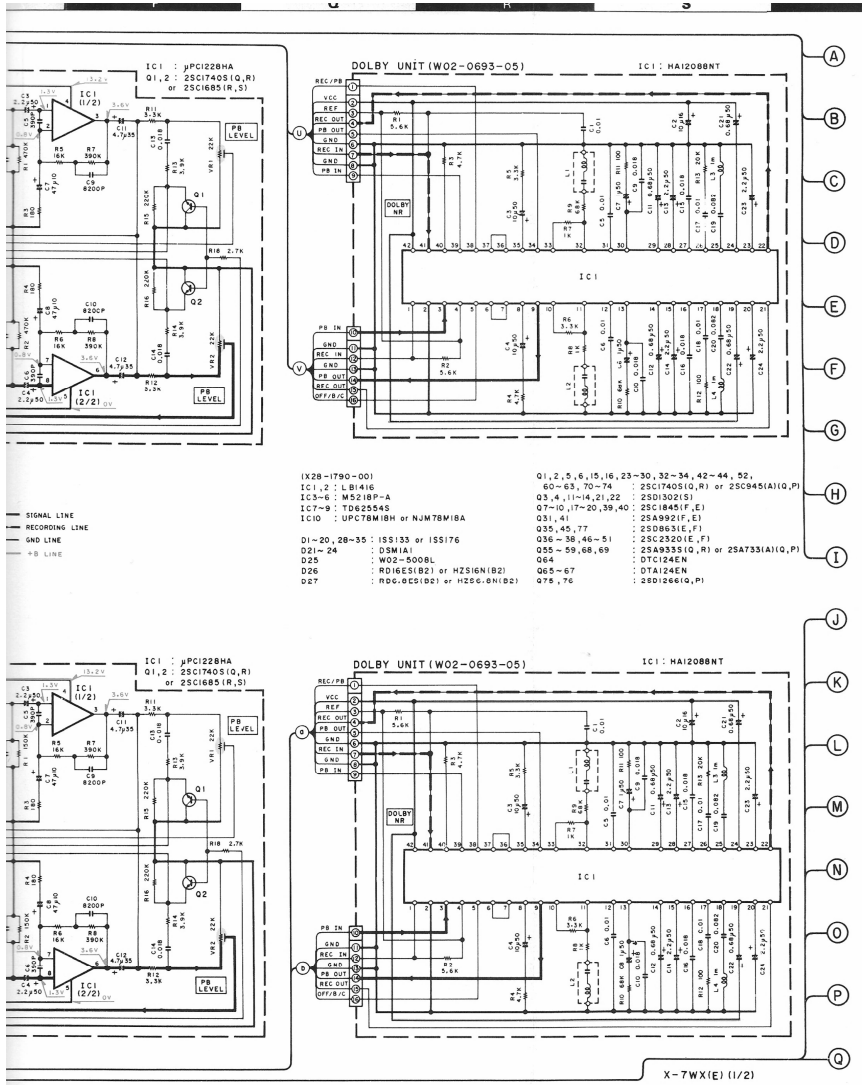
BA6251F

HA12088NT

UPC78M18H

DTA124EN





(X28-1790-00)

IC1,2	: LB1416
IC3~6	: M5218P-A
IC7~9	: TD62554S
IC10	: UPC78M18H or NJM78M18A
D1~20,28~35	: 1SS133 or 1SS176
D21~24	: DSM1A1
D25	: W02-5008L
D26	: RD16ES(B2) or HZS16N(B2)
D27	: RD6.8ES(B2) or HZS6.8N(B2)
Q1,2,5,6,15,16,23~30,32~34,42~44,52, 60~63,70~74	: 2SC1740S(Q,R) or 2SC945(A)(Q,P)
Q3,4,11~14,21,22	: 2SD1302(S)
Q7~10,17~20,39,40	: 2SC1845(F,E)
Q31,41	: 2SA992(F,E)
Q35,45,77	: 2SD863(E,F)
Q36~38,46~51	: 2SC2320(E,F)
Q55~59,68,69	: 2SA933S(Q,R) or 2SA733(A)(Q,P)
Q64	: DTC124EN
Q65~67	: DTA124EN
Q75,76	: 2SD1266(Q,P)

NJM78M18A

UPD75106CW-021

DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance, une cassette étant insérée en mode de lecture. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.
Les tensions c.c. du circuit de polarité doivent être mesurées, l'appareil étant en mode d'enregistrement.

avec un voltant insérée en différer légèrex appareils et

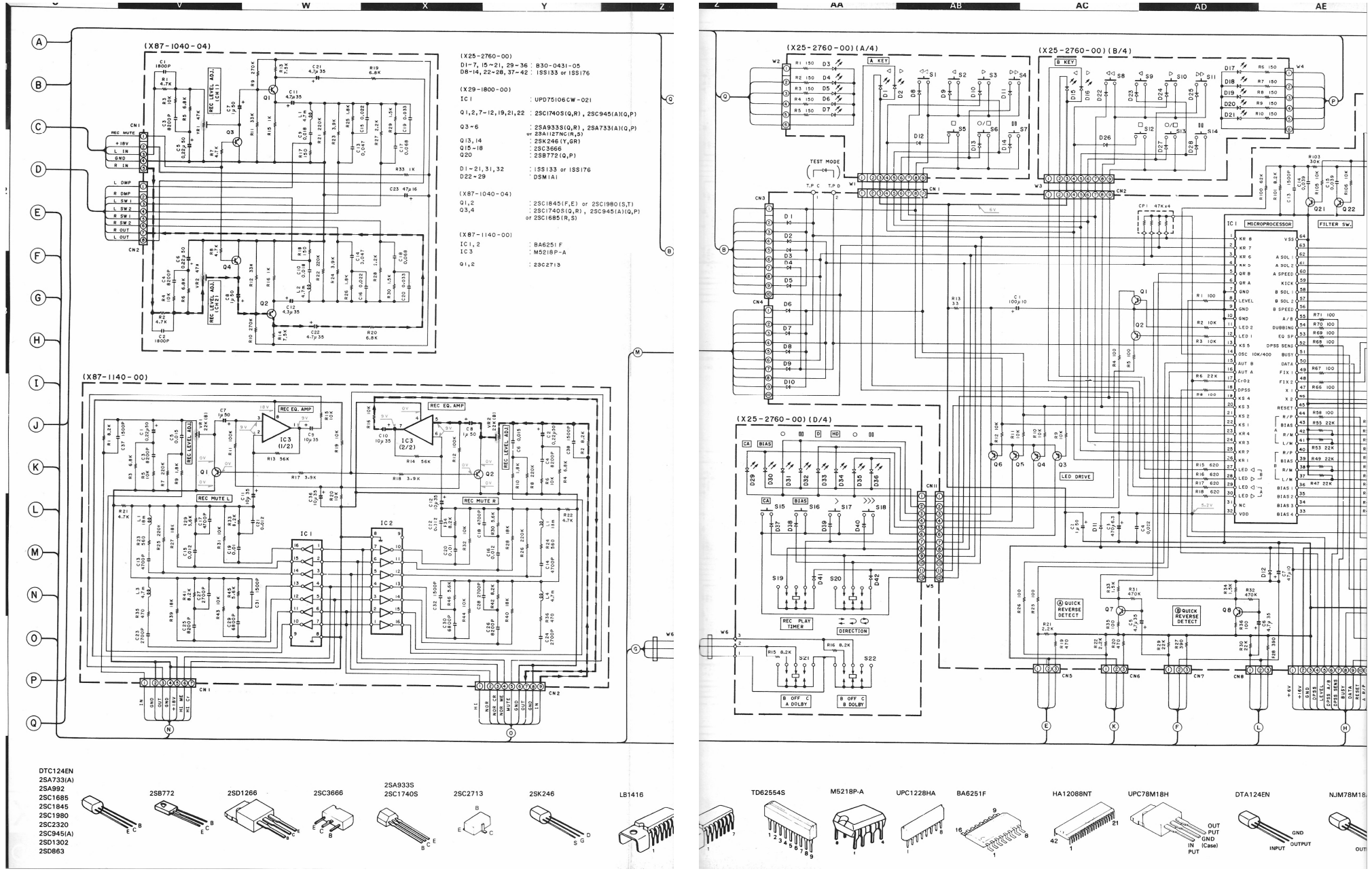
doivent être gistrement.

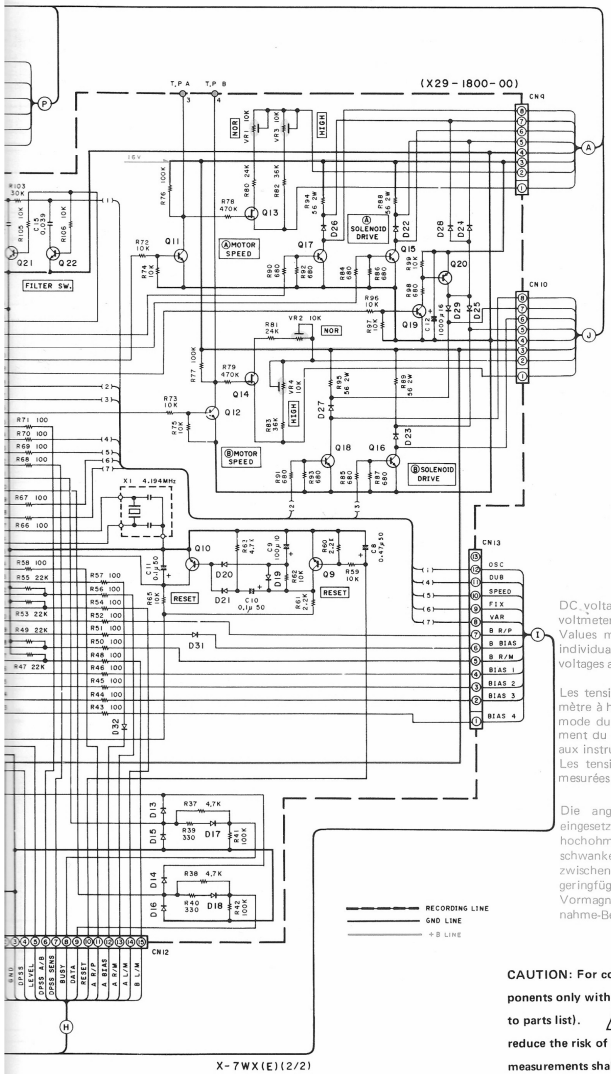
Die angegeben Gleichspannungswerte wurden bei eingesetzter Cassette in der Wiedergabe mit einem hochohmigen Spannungsmesser gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig. Die angegeben Gleichspannungswerte der Vormagnetisierungsschaltung wurden in der Aufnahme-Betriebsart gemessen.

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

X-7WX

KENWOOD


(X87-1040-04)
(X87-1140-00)
(X25-2760-00)(A/4)
(X25-2760-00)(B/4)
(X25-2760-00)(D/4)
(X25-2760-00)
D1-7, 15~21, 29~36 : B30-0431-05
D8-14, 22-28, 37~42 : ISS133 or ISS176
(X29-1800-00)
IC1 : UPD75106CW-021
Q1,2,7-12,19,21,22 : 2SC1740S(Q,R), 2SC945(A)(Q,P)
Q3~6 : 2SA933S(Q,R), 2SA733(A)(Q,P) or 2SA1127NC(R,S)
Q13,14 : 2SK246(Y,GR)
Q15-18 : 2SC3666
Q20 : 2SB772(Q,P)
D1-21,31,32 : ISS133 or ISS176
D22-29 : DSM1A1
(X87-1040-04)
Q1,2 : 2SC1845(F,E) or 2SC1980(S,T)
Q3,4 : 2SC1740S(Q,R), 2SC945(A)(Q,P) or 2SC1685(R,S)
(X87-1140-00)
IC1,2 : BA6251F
IC3 : M5218P-A
Q1,2 : 2SC2713
REC LEVEL ADJ.
REC EQ. AMP
REC MUTE L
REC MUTE R
TEST MODE
A KEY
B KEY
MICROPROCESSOR
FILTER SW.
LED DRIVE
REC PLAY TIMER
DIRECTION
A QUICK REVERSE DETECT
B QUICK REVERSE DETECT
DTC124EN
2SA733(A)
2SA992
2SC1685
2SC1845
2SC1980
2SC2320
2SC945(A)
2SD1302
2SD863
2SB772
2SD1266
2SC3666
2SA933S
2SC1740S
2SC2713
2SK246
LB1416
TD62554S
M5218P-A
UPC1228HA
BA6251F
HA12088NT
UPC78M18H
DTA124EN
NJM78M18



X-7WX(E)(2/2)

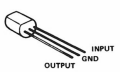
DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance, une cassette étant insérée en mode du lecture. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.
Les tensions c.c. du circuit de polarité doivent être mesurées, l'appareil étant en mode d'enregistrement.

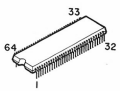
Die angegeben Gleichspannungswerte wurden bei eingesetzter Cassette in der Wiedergabe mit einem hochohmigen Spannungsmesser gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig. Die angegeben Gleichspannungswerte der Vormagnetisierungsschaltung wurden in der Aufnahme-Betriebsart gemessen.

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

NJM78M18A

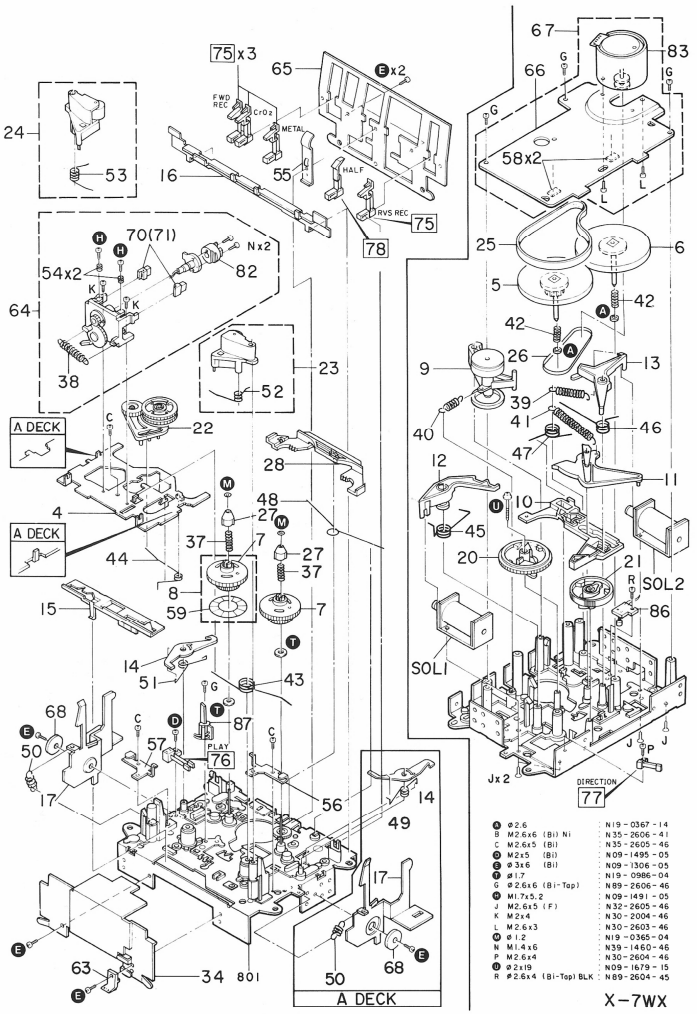


UPD75106CW-021



X-7WX
KENWOOD

EXPLODED VIEW (MECHANISM)

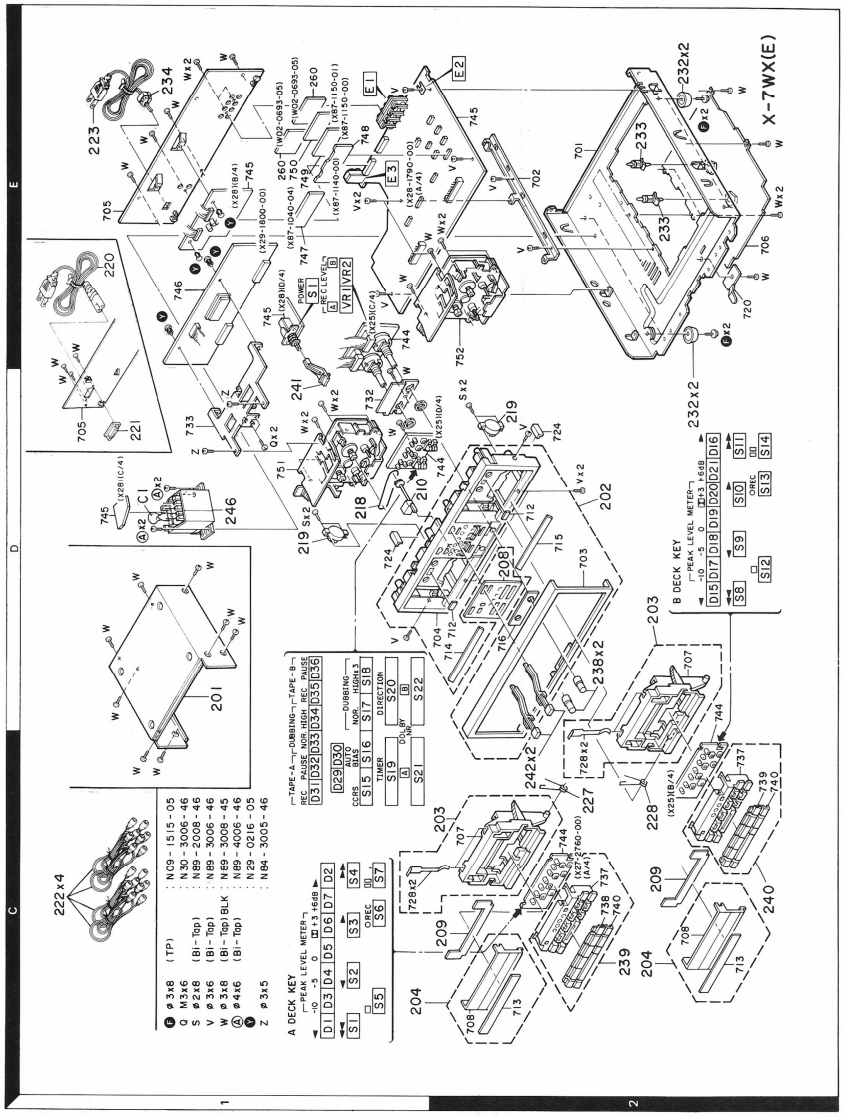


A	Ø2.6	N19-0367-14
B	M2.6x6 (Bi) Ni	N35-2606-41
C	M2.6x5 (Bi)	N35-2605-46
D	M2x5 (Bi)	N09-1495-05
E	Ø3x6 (Bi)	N09-1306-05
F	Ø1.7	N19-0986-04
G	Ø2.6x6 (Bi-Top)	N89-2606-46
H	M1.7x5.2	N09-1491-05
J	M2.6x5 (F)	N32-2605-46
K	M2x4	N30-2004-46
L	M2.6x3	N30-2603-46
M	Ø1.2	N19-0365-04
N	M1.4x6	N39-1460-46
P	M2.6x4	N30-2604-46
Q	Ø2x19	N09-1679-15
R	Ø2.6x4 (Bi-Top) BLK	N89-2604-45

X-7WX

Parts with the exploded numbers larger than 700 are not supplied.

EXPLODED VIEW (UNIT)



Parts with the exploded numbers larger than 700 are not supplied.

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PARTS LIST

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
			X-7WX			
201	1D	*	A01-1526-01	METALLIC CABINET		
202	2D	*	A20-5003-03	PANEL ASSY	UMUEEA	
202	2D	*	A20-5004-03	PANEL ASSY	T	
203	1C,2D	*	A53-0868-13	CASSETTE HOLDER ASSY		
204	1D	*	A53-0870-03	CASSETTE LID ASSY		
208	2D	*	B03-2121-03	DRESSING PLATE (FRONT)		
209	2C	*	B03-2122-04	DRESSING PLATE (HOLDER)		
210	1D		B35-0034-05	TAPE COUNTER		
-			B46-0094-03	WARRANTY CARD	UUE	
-			B46-0095-03	WARRANTY CARD	UUE	
-			B46-0122-13	WARRANTY CARD	E	
-			B46-0123-03	WARRANTY CARD	T	
-		*	B50-6532-00	INSTRUCTION MANUAL(ENGLISH)	UMUEEA	
-		*	B50-6533-00	INSTRUCTION MANUAL(FRENCH)	MEA	
-		*	B50-6534-00	INSTRUCTION MANUAL(SPANISH)	MA	
-		*	B50-6535-00	INSTRUCTION MANUAL(ENGLISH)	T	
-		*	B50-6536-00	INSTRUCTION MANUAL(G,D,I)	E	
-		*	B50-6605-00	INSTRUCTION MANUAL(ARABIC)	MA	
-			B58-0223-04	CAUTION CARD (PRE-SET 120V)	U	
-			B58-0513-04	CAUTION CARD (PRESET220-240)	UE	
-			B59-0092-00	SERVICE DIRECTORY	UUE	
⚠ C1	1D		C91-0647-05	CERAMIC 0.01UF P	TE	
218	1D		D16-0096-04	BELT (TAPE COUNTER)	UMUETE	
219	1D,2D	*	D39-0183-05	DAMPER	UMUETE	
⚠ 220	1D		E30-1305-15	AC POWER CORD (INLET)	UMUE	
⚠ 220	1D		E30-1329-05	AC POWER CORD (INLET)	A	
⚠ 221	1D		E03-0102-25	AC INLET	UMUEA	
222	1C		E30-0615-05	AUDIO CORD		
⚠ 223	1E		E30-0459-05	AC POWER CORD	E	
⚠ 223	1E		E30-1416-05	AC POWER CORD	T	
227	2C	*	G01-1959-04	TORSION COIL SPRING (A)		
228	2C	*	G01-1960-04	TORSION COIL SPRING (B)		
-		*	H01-7322-04	ITEM CARTON CASE	T	
-		*	H01-7387-04	ITEM CARTON CASE	UMUEEA	
-			H10-1849-12	POLYSTYRENE FOAMED FIXTURE		
-			H20-0417-04	PROTECTION COVER(460X370X360)	MA	
-			H25-0148-04	PROTECTION BAG (110X230X0.07)		
-			H25-0223-04	PROTECTION BAG (750X350)	UUETE	
-			H25-0232-04	PROTECTION BAG (235X350)		
232	2E		J02-0170-04	FOOT		
233	2E		J19-0514-05	UNIT HOLDER (11.3MM)		
⚠ 234	1E		J42-0083-05	POWER CORD BUSHING	TE	
-			J61-0307-05	WIRE BAND		
238	2D		K29-1976-04	KNOB (VOLUME)		
239	2C	*	K29-2531-03	KNOB ASSY (OPERATION KEY)		
240	2C	*	K29-2532-03	KNOB ASSY (OPERATION KEY)		
241	1E	*	K29-2538-04	KNOB (BUTTON) (POWER)		
242	2D	*	K29-2539-04	KNOB (BUTTON) (EJECT)		
⚠ 246	1D	*	L01-7442-05	POWER TRANSFORMER	TE	

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⚠ 246	1D	*	L01-7444-05	POWER TRANSFORMER	UMUEA	
F	2E		N09-1515-05	TAPPING SCREW (Ø3XB)		
Y	1E		N29-0216-05	RIVET		
OPERATION UNIT (X25-2760-00)						
D1 -7	2C		B30-0431-05	LED(LN21CPH) LEVEL METER		
D15 -21	2C		B30-0431-05	LED(LN21CPH) LEVEL METER		
D29 -36	1D		B30-0431-05	LED(LN21CPH) INDICATOR		
VR1 ,2	1E		R06-4071-05	POTENTIOMETER(50KX2) REC LEVEL		
S1 -18	1C,1D		S40-1064-05	PUSH SWITCH (OPERATION KEY)		
S19 -22	1D	*	S31-1017-05	SLIDE SWITCH (DIRT,DLBY,TIM)		
D8 -14			1SS133	DIODE		
D8 -14			1SS176	DIODE		
D22 -28			1SS133	DIODE		
D22 -28			1SS176	DIODE		
D37 -42			1SS133	DIODE		
D37 -42			1SS176	DIODE		
RECORD/PLAY BACK UNIT (X28-1790-00, -21)						
C1 ,2			CK45FB1H471K	CERAMIC 470PF K		
C3 -6			CC45FSL1H221J	CERAMIC 220PF J		
C7 ,8			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C9 -14			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C15 ,16			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C17 ,18			CE04KW1H0R1M	ELECTRO 0.1UF 50WV		
C23 -26			CC45FSL1H221J	CERAMIC 220PF J		
C27 ,28			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C29 -32			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C33 -38			CE04KW1V100M	ELECTRO 10UF 35WV		
C39 -42			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C45 ,46			CE04KW1H0R1M	ELECTRO 0.1UF 50WV		
C51		*	CE04KW1A331M	ELECTRO 330UF 10WV		
C52			CE04KW1C220M	ELECTRO 22UF 16WV		
C53			CE04KW1C101M	ELECTRO 100UF 16WV		
C54 ,55			CE04KW1V100M	ELECTRO 10UF 35WV		
C56			CE04KW1V220M	ELECTRO 22UF 35WV		
C57			CF92FV1H152J	MF 1500PF J		
C58			CF92FV1H562J	MF 5600PF J		
C59			C91-0774-05	POLYPRO 1200PF J		
C60			CF92FV1H332J	MF 3300PF J		
C61		*	CE04KW1A331M	ELECTRO 330UF 10WV		
C62			CE04KW1C220M	ELECTRO 22UF 16WV		
C63			CE04KW1C101M	ELECTRO 100UF 16WV		
C64 ,65			CE04KW1V100M	ELECTRO 10UF 35WV		
C66			CE04KW1V220M	ELECTRO 22UF 35WV		
C67			CF92FV1H152J	MF 1500PF J		
C68			CF92FV1H562J	MF 5600PF J		
C69			C91-0774-05	POLYPRO 1200PF J		
C70			CF92FV1H152J	MF 1500PF J		
C71 ,72			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C73 ,74			CE04KW1V100M	ELECTRO 10UF 35WV		
C75			CK45FB1H391K	CERAMIC 390PF K		
C76			CC45FSL1H271J	CERAMIC 270PF J		
C77			CE04KW1H010M	ELECTRO 1.0UF 50WV		

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X-7WX

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C78 -81			CE04KW1V100M	ELECTRO 10UF 35WV		
C82 ,83			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C84			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C85			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C86			CC45FSL1H151J	CERAMIC 150PF J		
C87			CF92FV1H822J	MF 8200PF J		
C88			CE04KW1V100M	ELECTRO 10UF 35WV		
C89			CE04KW1C330M	ELECTRO 33UF 16WV		
C90			CE04KW1C470M	ELECTRO 47UF 16WV		
C91			CE04KW1A471M	ELECTRO 470UF 10WV		
C92 -96			CE04KW1V100M	ELECTRO 10UF 35WV		
C97			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C98			CE04KW1A101M	ELECTRO 100UF 10WV		
C99 ,100			CE04KW1V100M	ELECTRO 10UF 35WV		
C101			CE04KW1V102M	ELECTRO 1000UF 35WV		
C102			CE04KW1E332M	ELECTRO 3300UF 25WV		
C105			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C106			C91-0769-05	CERAMIC 0.01UF M		
C107-110			CK45FF1H103Z	CERAMIC 0.01UF Z		
C112			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C114,115			C91-0757-05	CERAMIC 0.001UF K		
E1	1E		E13-0814-05	PHONO JACK (BP) TAPE A,B		
E2	1E	*	E23-0149-05	TERMINAL (EARTH)		
E3	1E		E11-0165-05	MINIATURE PHONE JACK(S CONT)	UMUEA	
E3	1E	*	E11-0168-05	MINIATURE PHONE JACK(S CONT)	TE	
L1 -4			L39-0126-05	TRAP COIL		
L5 ,6			L79-0720-05	LC FILTER		
L7 ,8		*	L32-0341-05	OSCILATING COIL		
L9 -14			L39-0126-05	TRAP COIL		
L15 ,16			L79-0720-05	LC FILTER		
R111			RD14GB2E270J	FL-PROOF RD 27 J 1/4W		
R112			RD14GB2E4R7J	FL-PROOF RD 4.7 J 1/4W		
R131			RD14GB2E270J	FL-PROOF RD 27 J 1/4W		
R132			RD14GB2E4R7J	FL-PROOF RD 4.7 J 1/4W		
R215			RS14KB3A391J	FL-PROOF RS 390 J 1W		
VR1 -4			R12-5046-05	TRIMMING POT.(100K) BIAS		
S1	1E		S40-2182-15	PUSH SWITCH (POWER)		
D1 -20			1SS133	DIODE		
D1 -20			1SS176	DIODE		
D21 -24			DSM1A1	DIODE		
⚠ D25			WO2-5008L	DIODE		
D26			HZS16N(B2)	ZENER DIODE		
D26			RD16ES(B2)	ZENER DIODE		
D27		*	HZS6.8N(B2)	ZENER DIODE		
D27		*	RD6.8ES(B2)	ZENER DIODE		
D28 -35			1SS133	DIODE		
D28 -35			1SS176	DIODE		
IC1 ,2			LB1416	IC(5PT LED LEVEL METER DRIVER)		
IC3 -6			M5218P-A	IC(8P AMP X2)		
IC7 -9			TD62554S	IC(4CH TRANSISTOR ARRAY)		
IC10			NJM78M18A	IC(VOLTAGE REGULATOR/ +18V)		
IC10			UPC78M18H	IC(VOLTAGE REGULATOR/ +18V)		

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Q1 ,2			2SC1740S(Q,R)	TRANSISTOR				
Q1 ,2			2SC945(A)(Q,P)	TRANSISTOR				
Q3 ,4			2SD1302(S)	TRANSISTOR				
Q5 ,6			2SC1740S(Q,R)	TRANSISTOR				
Q5 ,6			2SC945(A)(Q,P)	TRANSISTOR				
Q7 -10			2SC1845(F,E)	TRANSISTOR				
Q11 -14			2SD1302(S)	TRANSISTOR				
Q15 ,16			2SC1740S(Q,R)	TRANSISTOR				
Q15 ,16			2SC945(A)(Q,P)	TRANSISTOR				
Q17 -20			2SC1845(F,E)	TRANSISTOR				
Q21 ,22			2SD1302(S)	TRANSISTOR				
Q23 -30			2SC1740S(Q,R)	TRANSISTOR				
Q23 -30			2SC945(A)(Q,P)	TRANSISTOR				
Q31			2SA992(F,E)	TRANSISTOR				
Q32 -34			2SC1740S(Q,R)	TRANSISTOR				
Q32 -34			2SC945(A)(Q,P)	TRANSISTOR				
Q35			2SD863(E,F)	TRANSISTOR				
Q36 -38			2SC2320(E,F)	TRANSISTOR				
Q39 ,40			2SC1845(F,E)	TRANSISTOR				
Q41			2SA992(F,E)	TRANSISTOR				
Q42 -44			2SC1740S(Q,R)	TRANSISTOR				
Q42 -44			2SC945(A)(Q,P)	TRANSISTOR				
Q45			2SD863(E,F)	TRANSISTOR				
Q46 -51			2SC2320(E,F)	TRANSISTOR				
Q52			2SC1740S(Q,R)	TRANSISTOR				
Q52			2SC945(A)(Q,P)	TRANSISTOR				
Q55 -59			2SA733(A)(Q,P)	TRANSISTOR				
Q55 -59			2SA933S(Q,R)	TRANSISTOR				
Q60 -63			2SC1740S(Q,R)	TRANSISTOR				
Q60 -63			2SC945(A)(Q,P)	TRANSISTOR				
Q64			DTC124EN	DIGITAL TRANSISTOR				
Q65 -67			DTA124EN	DIGITAL TRANSISTOR				
Q68 ,69			2SA733(A)(Q,P)	TRANSISTOR				
Q68 ,69			2SA933S(Q,R)	TRANSISTOR				
Q70 -74			2SC1740S(Q,R)	TRANSISTOR				
Q70 -74			2SC945(A)(Q,P)	TRANSISTOR				
Q75 ,76			2SD1266(Q,P)	TRANSISTOR				
Q77			2SD863(E,F)	TRANSISTOR				
260	1E		W02-0693-05	ELECTRIC CIRCUIT MODULE(DOLBY)				
CONTROL CIRCUIT UNIT (X29-1800-81)								
C1			CE04KW1A101M	ELECTRO	100UF	10WV		
C2			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C3			CE04KW0J471M	ELECTRO	470UF	6.3WV		
C4			CK45FF1H223Z	CERAMIC	0.022UF	Z		
C5 ,6			CE04KW1V4R7M	ELECTRO	4.7UF	35WV		
C7			CE04KW1A470M	ELECTRO	47UF	10WV		
C8			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C9			CE04KW1A101M	ELECTRO	100UF	10WV		
C10 ,11			CE04KW1H0R1M	ELECTRO	0.1UF	50WV		
C12			CE04KW1C102M	ELECTRO	1000UF	16WV		
C13			CF92FV1H152J	MF	1500PF	J		
C14 ,15			CF92FV1H393J	MF	0.039UF	J		
L1			L40-1011-14	SMALL FIXED INDUCTOR(100UH,K)				

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X1			L78-0209-05	RESONATOR (4.194MHZ)				
CP1			R90-0202-05	MULTI-COMP 47KX4 J 1/6W				
R88 ,89			RS14KB3D560J	FL-PROOF RS 56 J 2W				
R94 ,95			RS14KB3D560J	FL-PROOF RS 56 J 2W				
VR1 -4			R12-3100-05	TRIMMING POT.(10K) SPEED				
D1 -21			1SS133	DIODE				
D1 -21			1SS176	DIODE				
D22 -29			DSM1A1	DIODE				
D31 ,32			1SS133	DIODE				
D31 ,32			1SS176	DIODE				
IC1		*	UPD75106CW-021	IC(MICROPROCESSOR)				
Q1 ,2			2SC1740S(Q,R)	TRANSISTOR				
Q1 ,2			2SC945(A)(Q,P)	TRANSISTOR				
Q3 -6			2SA733(A)(Q,P)	TRANSISTOR				
Q3 -6			2SA933S(Q,R)	TRANSISTOR				
Q7 -12			2SC1740S(Q,R)	TRANSISTOR				
Q7 -12			2SC945(A)(Q,P)	TRANSISTOR				
Q13 ,14			2SK246(Y,GR)	FET				
Q15 -18			2SC3666	TRANSISTOR				
Q19			2SC1740S(Q,R)	TRANSISTOR				
Q19			2SC945(A)(Q,P)	TRANSISTOR				
Q20			2SB772(Q,P)	TRANSISTOR				
Q21 ,22			2SC1740S(Q,R)	TRANSISTOR				
Q21 ,22			2SC945(A)(Q,P)	TRANSISTOR				
RECORD AMPLIFIER UNIT (X87-1040-04)								
C1 ,2		*	C91-0658-05	CERAMIC	0.0018UF	K		
C3 ,4			C91-0674-05	CERAMIC	0.0082UF	K		
C5 ,6			CE04FW1HR22MEL	ELECTRO	0.22UF	50WV		
C7 ,8			CE04FW1H010MEL	ELECTRO	1.0UF	50WV		
C9 ,10			CF92FV1H183J	MF	0.018UF	J		
C11 ,12			CE04FW1V4R7MEL	ELECTRO	4.7UF	35WV		
C13 ,14			CF92FV1H473J	MF	0.047UF	J		
C15 ,16			C91-0684-05	CERAMIC	0.022UF	K		
C17 ,18			CF92FV1H683J	MF	0.068UF	J		
C19 ,20			C91-0688-05	CERAMIC	0.033UF	K		
C21 ,22			CE04FW1V4R7MEL	ELECTRO	4.7UF	35WV		
C23			CE04KW1C101M	ELECTRO	100UF	16WV		
L1 ,2			L40-4725-29	SMALL FIXED INDUCTOR(4.7MH,J)				
VR1 ,2			R12-3103-05	TRIMMING POT.(47K) REC LEVEL				
Q1 ,2			2SC1845(F,E)	TRANSISTOR				
Q1 ,2			2SC1980(S,T)	TRANSISTOR				
Q3 ,4			2SC1685(R,S)	TRANSISTOR				
Q3 ,4			2SC1740S(Q,R)	TRANSISTOR				
Q3 ,4			2SC945(A)(Q,P)	TRANSISTOR				
RECORD/PLAY BACK UNIT (X87-1140-00)								
C1 ,2			CE04KW1HR22M	ELECTRO	0.22UF	50WV		
C3 ,4			CF92FV1HB22J	MF	8200PF	J		
C5 ,6			CF92FV1H153J	MF	0.015UF	J		
C7 ,8			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C9 -12			CE04KW1V100M	ELECTRO	10UF	35WV		
C13 ,14			CF92FV1H472J	MF	4700PF	J		
C15 ,16			CF92FV1H123J	MF	0.012UF	J		

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PARTS LIST

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C17 ,18			CF92FV1H472J	MF 4700PF J		
C19 ,20			CF92FV1H103J	MF 0.010UF J		
C23 ,24			CF92FV1H272J	MF 2700PF J		
C25 ,26			CF92FV1H822J	MF 8200PF J		
C27 ,28			CF92FV1H272J	MF 2700PF J		
C29 ,30			CF92FV1H682J	MF 6800PF J		
C31 ,32			CF92FV1H152J	MF 1500PF J		
C36			CE04KW1V100M	ELECTRO 10UF 35WV		
C37 ,38			CF92FV1H152J	MF 1500PF J		
L1 ,2		*	L40-1835-29	SMALL FIXED INDUCTOR(18MH,G)		
L3 ,4			L40-4725-29	SMALL FIXED INDUCTOR(4.7MH,J)		
J1 -8		*	R92-0350-05	JUMPER WIRE (RESISTOR TYPE)		
R1 ,2		*	RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R3 ,4			RD41FB2B682J	CYLND CHIP R 6.8K J 1/8W		
R5 ,6			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R7 ,8			RD41FB2B224J	CYLND CHIP R 220K J 1/8W		
R9 ,10			RD41FB2B182J	CYLND CHIP R 1.8K J 1/8W		
R11 ,12		*	RD41FB2B104J	CYLND CHIP R 100K J 1/8W		
R13 ,14		*	RD41FB2B563J	CYLND CHIP R 56K J 1/8W		
R15 ,16			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R17 ,18		*	RD41FB2B392J	CYLND CHIP R 3.9K J 1/8W		
R19 ,20			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R21 ,22			RD41FB2B472J	CYLND CHIP R 4.7K J 1/8W		
R23 ,24		*	RD41FB2B561J	CYLND CHIP R 560 J 1/8W		
R25 ,26			RD41FB2B224J	CYLND CHIP R 220K J 1/8W		
R27 ,28		*	RD41FB2B183J	CYLND CHIP R 18K J 1/8W		
R29 ,30		*	RD41FB2B562J	CYLND CHIP R 5.6K J 1/8W		
R31 ,32			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R33 ,34		*	RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R35 ,36			RD41FB2B471J	CYLND CHIP R 470 J 1/8W		
R39 ,40		*	RD41FB2B183J	CYLND CHIP R 18K J 1/8W		
R41 ,42		*	RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R43 ,44			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R45 ,46		*	RD41FB2B562J	CYLND CHIP R 5.6K J 1/8W		
VR1 ,2			R12-3101-05	TRIMMING POT.(22K) REC LEVEL		
IC1 ,2			BA6251F	IC(7CH TRANSISTOR ARRAY)		
IC3			M5218P-A	IC(OP AMP X2)		
Q1 ,2			2SC2713	TRANSISTOR		
PLAY BACK AMPLIFIER UNIT (X87-1150-00, -01)						
C1 ,2			CC45FSL1H560J	CERAMIC 56PF J		
C1 ,2			CK45FB1H561K	CERAMIC 560PF K		
C3 ,4			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C5 ,6			CK45FB1H391K	CERAMIC 390PF K		
C7 ,8			CE04KW1A470M	ELECTRO 47UF 10WV		
C9 ,10			CF92FV1H822J	MF 8200PF J		
C11 ,12			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C13 ,14			CF92FV1H183J	MF 0.018UF J		
C15			CE04KW1C330M	ELECTRO 33UF 16WV		
VR1 ,2			R12-3101-05	TRIMMING POT.(22K) PB LEVEL		
IC1			UPC1228HA	IC(PREAMP FOR TAPE EQ X2)		
Q1 ,2			2SC1685(R,S)	TRANSISTOR		
Q1 ,2			2SC1740S(Q,R)	TRANSISTOR		

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WX X-7WX

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MECHANISM ASS'Y (A), (B) (X92-1170-00, -01)						
4	2A	*	A11-0193-13	SUB CHASSIS (R ER)		
4	2A	*	A11-0194-13	SUB CHASSIS (R EL)		
5	1B		DD1-0066-05	FLYWHEEL ASSY		
6	1B		DD1-0067-05	FLYWHEEL ASSY		
7	2A		DD3-0236-04	REEL DISK		
10	2B		D10-1405-03	SLIDER		
11	2B		D10-1406-03	ARM (DIRECTION)		
12	2B		D10-1407-03	ARM (FD TRIGGER)		
13	2B		D10-1408-03	ARM (FR TRIGGER)		
14	2A		D10-1409-04	ARM (LOCK)		
15	2A		D10-1410-03	SLIDER (DIRECTION)		
16	1A		D10-1411-03	LEVER		
17	3B		D10-1504-04	LEVER (A)		
17	3A		D10-1505-04	LEVER (B)		
20	2B	*	D13-0379-02	GEAR (FD TRIGGER)		
21	2B		D13-0267-12	GEAR (FR TRIGGER)		
22	2A		D14-0121-05	IDLER ASSY		
23	2A	*	D14-0164-03	PINCH ROLLER ASSY (R)		
24	1A	*	D14-0165-03	PINCH ROLLER ASSY (L)		
25	1B		D16-0115-04	BELT (REVERSE)		
26	2B		D16-0116-04	BELT		
27	2A		D19-0073-04	HUB SHAFT		
28	2A		D30-0013-03	BRAKE		
34	3A		F10-0569-04	SHIELDING PLATE		
37	2A	*	G01-1966-04	COMPRESSION SPRING		
38	2A		G01-1666-08	EXTENSION SPRING (DIRECTION)		
39	2B		G01-1667-04	EXTENSION SPRING (FR TRIGGER)		
40	2B		G01-1668-04	EXTENSION SPRING (F ARM)		
41	2B	*	G01-1669-14	EXTENSION SPRING		
42	1B		G01-1671-04	COMPRESSION SPRING		
43	2A	*	G01-1912-04	TORSION COIL SPRING		
44	2A		G01-1677-04	TORSION COIL SPRING		
45	2B		G01-1678-04	TORSION COIL SPRING		
46	2B		G01-1679-04	TORSION COIL SPRING (FRSP)		
47	2B		G01-1680-04	TORSION COIL SPRING		
48	2A		G01-1681-14	TORSION COIL SPRING (BRAKE)		
49	3A		G01-1682-04	TORSION COIL SPRING(ARMLOCK,R)		
50	3A		G01-1715-04	EXTENSION SPRING (LOCK LVR HD)		
51	2A	*	G01-1743-14	TORSION COIL SPRING(ARMLOCK,L)		
52	2A	*	G01-1967-04	COMPRESSION SPRING(PINCH SP,R)		
53	1A	*	G01-1968-04	COMPRESSION SPRING(PINCH SP,L)		
54	1A		G01-1758-08	COMPRESSION SPRING (AZIMUTH)		
55	3A	*	G02-0424-04	FLAT SPRING		
56	3A	*	G02-0423-04	FLAT SPRING		
57	3A	*	G02-0422-04	FLAT SPRING		
58	1B		G16-0108-04	SHEET		
59	2A		G16-0109-08	SHEET		
63	3A		J19-2644-04	HOLDER		
64	1A		J19-2528-05	HOLDER ASSY		
65	1A		J21-3624-04	SWITCH MOUNTING HARDWARE		
66	1B		J21-3625-04	FLYWHEEL MOUNTING HARDWARE		

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67	1B		J21-3701-03	MOUNTING HARDWARE ASSY		
68	3A,3B		J31-0179-14	COLLAR (LOCK LEVER)		
70	1A		J90-0158-08	GUIDE (HOLDER ASSY)		
-			J61-0054-05	WIRE BAND		
-			J61-0307-05	WIRE BAND		
A	1B,2B		N19-0367-14	FLAT WASHER (Ø2.6)		
D	3A		N09-1495-05	MACHINE SCREW (M2X5)		
E	3A,1B		N09-1306-05	TAPPING SCREW (Ø3X6)		
H	1A		N09-1491-05	MACHINE SCREW (M1.7X5.2)		
M	2A		N19-0365-04	FLAT WASHER (Ø1.2)		
T	2A,3A		N19-0986-04	FLAT WASHER (Ø1.7)		
U	2B	*	N09-1679-15	TAPTITE SCREW (Ø2X19)		
SOL1	2B		T94-0084-05	SOLENOID COIL		
SOL2	2B		T94-0086-15	SOLENOID COIL		
DOLBY B/C NOISE REDUCTION UNIT (W02-0693-05)						
IC1		*	HA12088NT	IC(DOLBY B/C NOISE REDUCTION)		

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X-7WX

SPECIFICATIONS

Type	Front Loading Auto-Reverse & Double Stereo Cassette Deck
Track System	4-track, 2-channel stereo/mono, recording/playback
Recording System	AC bias system (Bias frequency: 105 kHz)
Erasing System	AC system
Tape Speed	4.76 cm/sec (1-7/8 ips)
Heads	Hard permalloy playback/record head × 2 Double gap ferrite erasing head × 2
Motor	2-Speed DC servo motor × 2
Fast Winding Time	Approx. 80 seconds with C-60 tape
Frequency Response:	
Normal Tape	20 Hz to 16,000 Hz (30 Hz to 15,000 Hz, ± 3 dB)
CrO_2 Tape	20 Hz to 17,000 Hz (30 Hz to 16,000 Hz, ± 3 dB)
Metal Tape	20 Hz to 17,000 Hz (30 Hz to 16,000 Hz, ± 3 dB)
Signal-to Noise Ratio:	
Dolby C Type NR ON	75 dB (Metal tape)
Dolby B Type NR ON	67 dB (Metal tape)
Dolby NR OFF	58 dB (Metal tape)
Harmonic Distortion	Less than 1.0% (at 1 kHz, 0 VU 3rd H.D. metal tape)
Wow and Flutter	0.09% (W.R.M.S), ± 0.18% (DIN)
Input sensitivity/Impedance:	
LINE × 2	77.5mV/50 kohms
Output Level/Load Impedance:	
LINE × 2	270 mV/6.8 kohms
Power Consumption	22W
Dimensions	W: 340 mm (13-3/8") H: 119 mm (4-11/16") D: 340 mm (13-3/8")
Weight	5.8 kg (12.8 lb)
Reference Tapes	Normal: KENWOOD ND-54, TDK AD C-60 CrO_2: KENWOOD CD-54, TDK SA C-60 Metal: KENWOOD MD-46, TDK MA C-60

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Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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